

# THE IRON AGE

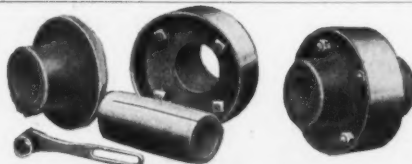
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# THE IRON AGE

New York, Thursday, July 11, 1907.

## The Clover Leaf Concrete Mixer.

A concrete mixer without wings, vanes, deflectors or other means within its interior for effecting the mixing of the concrete would be very inefficient under ordinary conditions. The Clover Leaf concrete mixer, made by the Clover Leaf Machine Company, South Bend, Ind., and shown in the illustrations, derived its name from the peculiar form of the drum, which makes it possible to dispense with the usual interior devices. Three simultaneous mixing movements are obtained when it is revolved, causing distribution from three different angles at once. The device is no longer an experiment, having been tried out under various conditions to demonstrate the effectiveness of its performance. Other features worthy of note are its light weight and the ready access

and the bottom going to the top, while the remainder is carried up by the same angles aided by the centrifugal force of the machine, and is effectively distributed the full width of the machine and over the portion previously doubled over. There are, therefore, practically six distributions to the mass every revolution, or from 80 to 90 distributions per minute. The mixing receptacle is oscillated from end to end twice each way each revolution of the machine, or from 50 to 60 times per minute. These end to end movements, together with the doubling over and carrying across of the concrete by the direct action of the machine, insure thorough intermingling of the ingredients.

Where the mixer is to be used in cement, stone and brick plants it is equipped with an appliance for conveying water to the mixing drum, a receptacle being placed

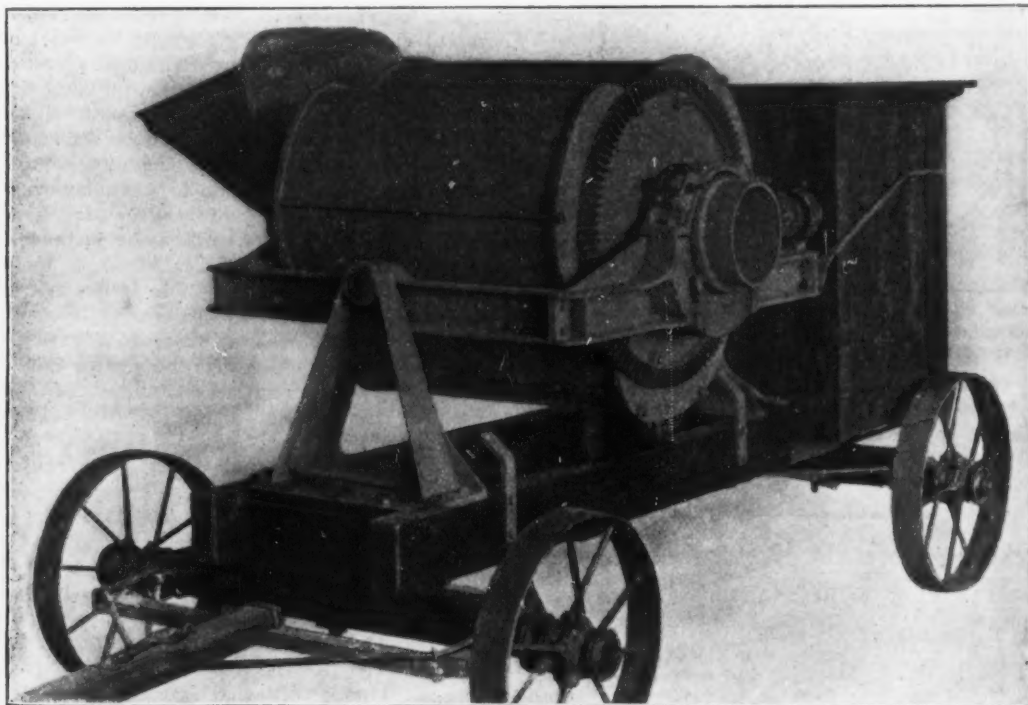


Fig. 1.—A Portable Gasoline Engine Driven Concrete Mixer Built by the Clover Leaf Machine Company, South Bend, Ind.

afforded to all parts by removing a single door, which exposes the whole interior. The machine may be fed or discharged while running and may be partly or entirely discharged at any time, since no lessening of the speed is necessary for discharging. The dumping is done by tilting the machine endwise, which is easily accomplished, since it is balanced. The consistency of the batch may be watched, as it is in full view all of the time.

Fig. 2 shows a sectional diagram of the mixer, illustrating by arrows the courses taken by the material while the mixer is being revolved. Since there are no inside vanes or deflectors, the charge is allowed to pass freely over the inside of the receptacle, and the angles being in line of the movement of the materials are constantly scoured by the action of the moving mass. It is impossible for the heavier and lighter aggregates to become separated. The entire mass commingles during the process of mixing, insuring uniform concrete both with respect to the fine and coarser materials and the even distribution of the cement. The charge is doubled over and scattered each time the angle passes up, and it is guaranteed that the mixer will not ball or roll the concrete. The curves or angles of the drum double over the greater portion of the mass, the top going to the bottom

above and inside the charging hopper, to which is attached a perforated pipe extending inside the machine, affording an even distribution of water and the avoiding of slushing. To afford access to the interior of the mixer a section of the drum is constructed so that it may be removed, exposing the entire interior of the mixing receptacle.

The company also builds a hand power mixer, the receptacle of which is of precisely the same form as that used on the power driven machine. A perfect mix, it is claimed, can be obtained regardless of how slowly the receptacle may revolve, as the material is doubled over and not rolled three times at each revolution of the drum. This is independent of the speed and is an important advantage in a hand operated machine. The mixer can be arranged to be operated by one man with a single crank, but two cranks are sometimes provided for higher speed operation by two men. In this case charging and discharging is accomplished by removing the door, the drum being revolved so as to bring the opening where all the material falls on a chute to the floor. The water is introduced by a pipe extending through one of the trunnions. Deflectors are employed in this machine to keep the material away from the ends of the drum and work it

toward the center. While not as desirable as the oscillating movement employed in the power driven machines, it serves the purpose and reduces the cost of this type of machine.

Three sizes of power driven machines are made, Nos. 4, 6 and 8, respectively, taking standard charges of  $4\frac{1}{2}$ ,  $6\frac{1}{2}$  and 9 cu. ft. and having daily capacities of 25 to 35, 50 to 60 and 70 to 90 cu. yd., respectively. These capacities are given in loose, dry material when worked into wet concrete. The power required is 2, 3 and 4 hp.

The power driven machines are generally equipped with the New Way air cooled gasoline engine. It is one particularly convenient for the purpose, being very compact, of few parts and generally convenient in operation. It requires no water cooling and is guaranteed to carry its full rated load any length of time in any temperature without overheating. The gears are incased and run in oil, and cement cannot get into the working parts. One oil cup lubricates all of the bearings. The crank case is hinged and the parts are so few that it can be taken

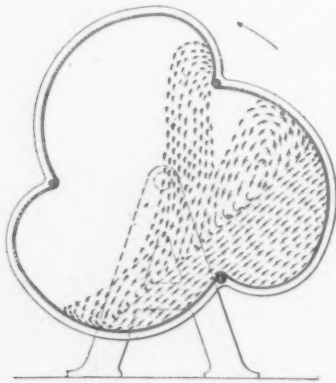


Fig. 2.—Diagrammatic Section of the Clover Leaf Mixer, Illustrating the Movements of the Contained Materials.

apart and reassembled in a very short time. There is no packing, no gasoline pump, and there are no delicate parts. The machine weighs about 440 lb., which is very light compared with its size, which is 3 to  $3\frac{1}{2}$  hp.

### General Appraisers' Work in the Fiscal Year.

The annual report of the Board of United States General Appraisers for the Government's fiscal year ended June 30, and given out Monday, shows that the work of the customs tribunal, which is the medium for the adjudication of differences between importers and the Government regarding questions of value and classification of foreign merchandise, has been conducted in an efficient manner.

The report states that at no time since the organization of the tribunal in 1890 has the business of the board been in such excellent condition. More protests have been decided than ever before, while the report declares that every protest can be decided within 60 days after submission. Marion De Vries, president of the board, said that he was much gratified at the showing made by his associates and the clerical force. Notwithstanding the fact that the Dingley tariff has been in existence 10 years, on the 24th of this month, it appears that customs litigation is increasing in volume.

During the year the board received 58,443 protests on questions of classification, as against 40,892 during the previous fiscal year. There were decided 80,765 classification protests, as against 33,557, a net gain of 22,322 more protests decided this year than received, as against 7335 more received than decided in the previous fiscal year. It is stated that 21,173 more protests were decided this year than in any previous year since the organization of the tribunal. There has been a substantial reduction in the number of protests on the suspended files. The volume of reappraisal appeals has been heavy, numbering over 7000. Of the classification protests arising the past year, 43,670 emanated from the port of New York and 14,773 from other ports.

### The Lubricating Properties of Amorphous Graphite.

From an interesting article on the above subject by H. C. Woodruff, general manager of the United States Graphite Company, Saginaw, Mich., we take the following:

There are two forms of graphite—flake, or foliated, and amorphous, or nonstructural. Though chemically the same, the latter is capable of finer pulverization and with careful treatment may be reduced to an impalpably fine powder absolutely free from grit or any sort of harmful impurity. Flake graphite, on the other hand, no matter how finely pulverized, always retains its original mica-like or crystalline structure.

Amorphous graphite is adhesive in the highest degree. This is one of the first requisites of an efficient lubricant in that to cool a hot bearing it is absolutely essential that the lubricating agent shall stay put where applied. To illustrate: Take a pinch of finely pulverized amorphous graphite and rub it in the palm of the hand, on paper or on some other convenient surface and observe its action. Note that the more one rubs the more effective is the lubrication, for this form of graphite is not easily removed from surfaces in frictional contact, but maintains constant and effective duty right at the point of contact and is at its best under heavy frictional pressure. Then, too, as an impalpable powder it readily and quickly penetrates and distributes itself in a smooth, slippery, even coating between the tightest bearings, filling every pore, crevice and interstice, thereby evening irregular bearing surfaces and reducing friction to a minimum.

A microscopic examination of apparently perfectly smooth bearings—cylinder surfaces for instance—will disclose many minute irregularities, which, in the nature of things, must be productive of more or less friction. This friction of course means wasted energy—a condition that more often than not means an overheated bearing. To overcome this friction effectively and utilize this otherwise wasted power, a lubricant possessing considerable "body" is required; that is, a substantial lubricant of such a nature as to eliminate as far as possible these microscopical irregularities and provide a bearing offering minimum resistance to the surfaces in play.

Experience has not only demonstrated time and again that oil in itself will accomplish this only to a certain extent, but it has also taught that pure, soft, finely powdered graphite, properly and judiciously applied, will do wonders, so that it only remains to make the proper application of the right sort of graphite. It has, therefore, long been the endeavor of intelligent engineers to secure a graphited oil—that is to say, an oil in which graphite floats or is held in suspension without precipitation sufficiently long to perform its duty, for it is easy to see the great advantage to be derived from the use of an oil having every drop impregnated with solid lubricating matter.

This seemingly simple problem, however, is one that has until lately baffled engineers of experience, but it has now been found that amorphous graphite when reduced to an impalpably fine powder will, when mixed with oil in the proportion of about one teaspoonful to the pint of oil, remain in perfect suspension long enough to feed through lubricator tubes without clogging, thus causing every drop of oil to carry its mite of graphite.

**Dominion Steel Affairs.**—Montreal advices state that the annual meeting of the shareholders of the Dominion Iron & Steel Company, which originally was called for July 5, has been postponed indefinitely. Special authority for taking such action was obtained by the management from the Nova Scotia Government. The present management is in favor of carrying the suit against the Dominion Coal Company to the courts, but the opposition, which claims to have secured control of the company, is desirous of effecting a settlement as soon as possible. On July 6 George Caverhill and W. G. Ross of Montreal were selected to fill vacancies on the board caused by the resignations of F. S. Pearson of New York and E. R. Wood of Toronto.



## Huge Ore Shipments Planned.

DULUTH, MINN., July 6, 1907.—The tremendous ore shipments planned for this year from the Mesaba range are tearing things to pieces all along that district. There was never a year in which so many changes in the surface conditions have been made. More mines are changing from milling and underground to steam shovel, and bigger holes are being torn in the ground than in any previous season. As an instance of the sort of work going on, it may be interesting to note that during June 210,000 cu. yd. of overburden were moved off the Canisteo, the record month by at least 50,000 yd., and 125,000 yd. came out of the adjacent Holman property. At the Canisteo Superintendent Greenway is working six or seven shovels in stripping. During May the removal at this mine was 150,000 yd.

### Railroad Preparations.

Some idea of the vast shipments that are expected may be gained from the season's schedules of the various railroads operating between the mines and upper lake ports. For instance, the Duluth, Missabe & Northern, which last year moved 11,220,000 tons of ore, is scheduled for a total traffic this year of 14,000,000, and the Duluth & Iron Range will handle, if it comes up to plans, almost precisely 1,000,000 tons more than the 8,200,000 it moved in 1906. The Great Northern will also increase its record of 6,130,000 tons by nearly 1,000,000. In other words, the two Minnesota iron ranges, whose total shipments of 1906 were 25,600,000 gross tons, are scheduled this season for a business approximating 30,000,000.

These schedules are the estimates made soon after the beginning of the shipping season by shippers of the ore sold by them, or that they expect to forward during the year. They are, to be sure, liable to be changed and are quite pliable, but the shippers endeavor to reach them and in some cases exceed early estimates. Last year several independent shippers were able materially to increase shipments over the estimates made early and on which the railroads based car allotments and dock space. It may be considered settled that, allowing for unexpected contingencies of strikes, accidents to transportation facilities and the like, from 28,000,000 to 29,000,000 tons of ore may be moved from Minnesota this year. Michigan districts last year shipped 12,800,000 tons, and have averaged for the past three years not far from 11,200,000. They are easily capable of a production in 1907 of 12,500,000, and will doubtless reach that amount, barring accidents and unforeseen contingencies.

A grand total of better than 40,000,000 tons is, therefore, a reasonable estimate. It will be no trouble to make that total, so far as any one of the factors is concerned, unless it may be with the unloading docks and lower lake railroads. The Duluth, Missabe & Northern Railroad in June moved the vast volume of 2,156,000 tons, and expects to do better for several succeeding months. The Duluth & Iron Range, with No. 5 dock out of commission, handled 1,303,000 tons in the month. This dock has now been completed, and is in service. It is the largest and fastest of that company's large equipment. The Great Northern, with its No. 3 dock incomplete, handled 1,218,000 tons in June. It also is now using this new big shipping pier.

### A New Steel Pier Planned.

A most important step has just been taken by the Duluth & Iron Range Railroad, in the decision to construct for the coming year's traffic a steel ore shipping pier. This pier will be 850 ft. long, exclusive of approaches, and will run out into water 40 ft. deep. Plans have been made and schedules of material are being prepared. Bids for the foundation will be opened soon, and the substructure will be put in during the present season. Piling will be driven and cut off below water level, to be capped with concrete piers about 10 ft. high. On these the steel structure will rest. The ore pockets will be wood lined. The dock will be 67 ft. high from water level to tracks.

While this dock may cost several times as much as a wood structure of corresponding capacity, it will wipe

away the ever present serious danger of fire, and will doubtless outlast many wood piers. The life of a wood ore dock is from 10 to 14 years, depending on the creosoting of main timbers, and the life of a steel dock should be more than 50 years. It is believed that the ore trade has reached a point where the ultimate form and size of structure may be considered settled, and should there be change in future a steel dock will offer much salvage to the wreckers, while a wood pier will give little or none.

Should a steel dock have been built, say, 10 years ago, it would to-day be obsolete, and would be of value merely for the material it contained, such has been the advance in the size of lake ships, and, consequently, in the height and capacity of docks. But it would seem that the limit of depth for lake ships must be pretty nearly reached, and that docks as now constructed are high enough. The first cost of a steel pier cannot be much less than \$8000 or \$9000 per pocket, or about \$1,200,000 for the proposed dock, including approaches. Three wood docks of the same size might be put up with that money. Ore chutes of the Escanaba type that have been put on the newest locks of both the Duluth, Missabe & Northern and Duluth & Iron Range will be used in the steel pier. These chutes are the full width of the pockets, and unload with less labor and more speedily than the old types. They have, however, introduced a new class of strain on structure, and in planning ore shipping piers in future careful study must be made of this.

The new Great Northern ore pier, completed and placed in service last week, has 374 pockets and a storage capacity for 100,000 gross tons. It is 73 ft. high above water and 68 ft. wide. It is the largest ore pier yet built on the lakes, and gives the road a total storage capacity for some 250,000 tons of ore; but this is to be increased next year by another, which the road proposes to erect and for which ground has just been purchased.

### On the Western Mesaba.

The Oliver Iron Mining Company is now preparing to increase its Western Mesaba activity by work at the large Arcturus deposit, where a contour survey is now under way and where an experimental washing plant will be installed very soon. The company has not yet added to the experimental washing plant that was installed at the Canisteo properties last fall, but is confident that it will work successfully, as it is even now making a product above the rated capacity of the works. There is, to be sure, a very considerable loss of fine ore, but this will probably be unavoidable, and it really makes less difference than would appear at first thought, as it is immaterial whether the loss of dust is in the washery or out of the furnace stack. Of course, it is greater in the washery. With this fine ore out the product is excellent for the furnace, being coarse, somewhat porous, and rather free from silica, while a large part of it will be within the Bessemer limit in phosphorus.

Lake shipping facilities have been growing with the demand, and not far from 4,000,000 tons capacity has been added since the close of navigation last fall. Many new ships are not yet in service, and it is estimated by large shippers that not less than 5,000,000 tons capacity will be available for business at the close of this season, additional to the amount in commission last fall.

Prof. C. K. Leith, formerly of the United States Geological Survey, is engaged this summer in a slight revision of Mesaba Government reports and in bringing the range geological map down to date, in view of publication anew in the final Lake Superior geological monograph, which will be in the hands of the printers soon. His monograph on the iron ore fields of southwestern Utah, field work on which has engaged his attention for some time past, is in the hands of the printers, and probably will be issued by the Government this year. It will be the first and only comprehensive and scientific study and review of the district, and will be received with much interest, for the Utah fields are undoubtedly of importance.

D. E. W.

The Barrow Steel Company, Ltd., of England, has purchased 20 square miles of hematite iron ore territory in Algeria, and will at once develop the property, which lies within 100 km. of the port of Algiers.



## Autogenous Welding.

### Use of the Oxy-Acetylene Blowpipe in Repair Work.

The comparatively new oxy-acetylene blowpipe has made possible the satisfactory repairing of fractured heavy castings and the accomplishing of other work by the adding of new metal or welding parts, hitherto considered commercially impracticable. To be able to weld together a broken frame of a heavy machine; to fill in defects in steel or gray iron castings with a homogeneous metal; to add metal to nickel steel forgings, which through imperfections would otherwise be useless; to replace metal broken off from an expensive metal part—all these and many other feats are possible with this intensely hot blowpipe flame. The oxy-acetylene system of welding has been given a thorough test under manufacturing conditions at the works of the Worcester Pressed Steel Company, Worcester, Mass. The company manufactures pressed steel parts for automobiles, bicycles and many special designs in deep drawing and cold forging, and was led to install this plant from the appreciation of the practical value of the process in connection with such work, but its usefulness in other work has also been amply demonstrated.

In this welding process oxygen and acetylene in a blowpipe flame are employed for obtaining the required heat. Each gas is generated in a separate apparatus, and conveyed through separate pipes to the blowpipe. The process has been made commercially valuable by developing a cheap means for producing oxygen. By combining a chemical product known as epurite with water, pure oxygen is as easily obtained as is acetylene by uniting calcium carbide and water.

#### The Oxygen Generating Apparatus

consists of two lead lined generating chambers arranged with a scrubber and settling chamber between. The generator is filled with the required amount of lukewarm water to which a charge of epurite is added, and while this solution is being stirred with a mechanical agitator a solution of iron sulphate and water is added, which acts as a catalyzer. The oxygen, liberated, passes from the generator through the scrubber and a water sealed trap to the gasometer; from the gasometer the oxygen is compressed to 10 atmospheres (147 lb.) by an air compressor into a pressure storage tank. It is then conducted through  $\frac{3}{8}$ -in. copper pipe, from which branches of  $\frac{1}{4}$ -in. copper pipe lead to the blowpipe connections. Reducing valves are arranged so that the operator can vary the pressure of the gas at the blowpipe at will. Each blowpipe is supplied with 22 different sized nozzles, for varying the size and power of the flame according to the thickness of the metal to be welded.

#### The Acetylene Generator

is of the water feed type, composed of a cylindrical shaped tank, which serves as a gasometer and regulator, connected by three water supply pipes to three carbide receptacles or trays, half cylindrical in shape, each containing six compartments. Each tray holds about 12 lb. of lump carbide. The acetylene is used under a practically uniform pressure varying from 2.2 to 3 lb. The pressure is obtained and maintained by two water levels in the gasometer, by which the supply and pressure of the gas are automatically governed. Any pressure in excess of 3 lb. escapes through a vent or blowoff outside the generator building. From the regulator and gasometer the acetylene is conveyed through a 1-in. main pipe, with a  $\frac{3}{4}$ -in. branch leading to each blowpipe connection.

A feature of the acetylene apparatus is a safety appliance located between the blowpipe connections and the acetylene gasometer. This consists of a 1-in. pipe leading into and two 1-in. pipes leading out from a rectangular metal chamber; the inlet pipe connects with the gasometer and one outlet conveys the acetylene to the blowpipes, while the other vents to the outside air. The inlets and outlets are separated by a water sealed trap, which prevents flame from reaching the generator and gasometer by burning back through the blowpipe supply pipes.

#### The Construction of the Blowpipe.

The blowpipe, which is made of brass, is specially designed on the injector principle, and carefully proportioned for its intended purpose. It is about 24 in. long and weighs 2 lb. It has two inlets, which remain entirely separate practically the entire length of the blowpipe, and enter a mixing chamber with a common outlet at the point of combustion. Acetylene is rich in carbon—containing 92.3 per cent.—and when mixed with air in a Bunsen burner a flame at a temperature of 3100 degrees F. is produced. The combustion of acetylene combined with oxygen produces the hottest flame known (6300 degrees F.), which is nearly the temperature of the electric arc. This is about 1200 degrees higher than the oxy-hydrogen blowpipe flame.

In lighting the blowpipe the acetylene is first turned on full; then the oxygen is added until the flame has only a single cone. At the apex of this cone the maximum temperature is obtained, and in welding this point is held from  $\frac{1}{8}$  to  $\frac{1}{4}$  in. from the metal to be welded. Too much acetylene produces two cones and a white color; an excess of oxygen is indicated by the flame assuming a violet tint.

Theoretically, two and one-half volumes of oxygen are required for complete combustion of one volume of acetylene. Practically, however, with the oxy-acetylene blowpipe the best welding results are obtained with 1.7 volumes of oxygen to one of acetylene. To establish the proper conditions for autogenously welding two metals it is necessary to bring them to their melting point without oxidizing or carburating. When the combustion is not complete the flame consists largely of carbon monoxide, and this, being converted at its extremity into carbon dioxide, forms with the hydrogen, a relatively cool jacket which protects the molten metal and the inner cone from loss of heat.

At the moment of initial combustion, when the acetylene is decomposed into elements of carbon and hydrogen, a heat of about 300 B.t.u per cubic foot of gas is generated. The total heat, however, generated per cubic foot of acetylene is about 1500 B.t.u., which aside from the initial decomposition is furnished mainly by the combustion in oxygen of the carbon into carbon dioxide and in lesser degree by the combustion of hydrogen into water vapor. Pure acetylene at a pressure less than 30 lb., even when passed through white hot pipes, is perfectly safe, but when mixed with oxygen or air is dangerous. An explosive gas mixture inclosed in a pipe ignites at a certain speed which increases as the square of the pipe section; therefore, to render safe the use of oxygen and acetylene in the blowpipe flame, the gas mixture is given a speed by pressure greater than the rate of propagation of the flame. No flux or molds are required to weld metals such as iron, steel and copper, but for alloys—namely, brass, bronze, &c.—a little borax or boric acid, moistened with water, is used simply to prevent the volatilized zinc from being deposited on the joint, destroying the weld.

#### The Welding Done by Fusion.

This process welds by fusion, forming a perfect metallic union of the parts, which is imperceptible after finishing. It is not brazing. The Worcester Pressed Steel Company employs it in place of riveting and soldering and for other forms of metal construction not heretofore possible. Two sheets of metal may be welded by placing their edges in contact, and following along the seam with a blowpipe. Tanks of almost any shape may be made by forming the body and edges separately, and, in assembling, tracing the seams (joints, butt and flush) with a blowpipe. To insure strength the joint is slightly overloaded by melting upon it a wire or rod of same material as the metal to be welded at the same time the edges are fused. The unfinished joint is stronger than the body of the metal, and the finished joint is practically equal in strength. Test pieces develop the fact that the weld of two pieces of steel has at least 85 per cent. the strength of the metal itself, and this without treatment by means of which a weld may be given practically the full strength of the metal.

**Interesting Repairs by Welding.**

Not only is this process adapted for making tanks, boilers, tubing, cylinders, pipe joints and angles, and for replacing brazing and riveting in many instances, but it effectively welds cast iron. In the foundry this apparatus saves defective castings in iron, steel, brass, copper, &c., for the blowholes can be readily filled and broken castings welded as strongly as new. In repair work it is especially valuable, and many expensive castings, forgings and machined parts may be saved from the junk pile by an hour's use of this blowpipe. Metals  $\frac{1}{4}$  in. and less thick can ordinarily be welded cheaper than they can be riveted. Steel and copper tanks for high and low pres-

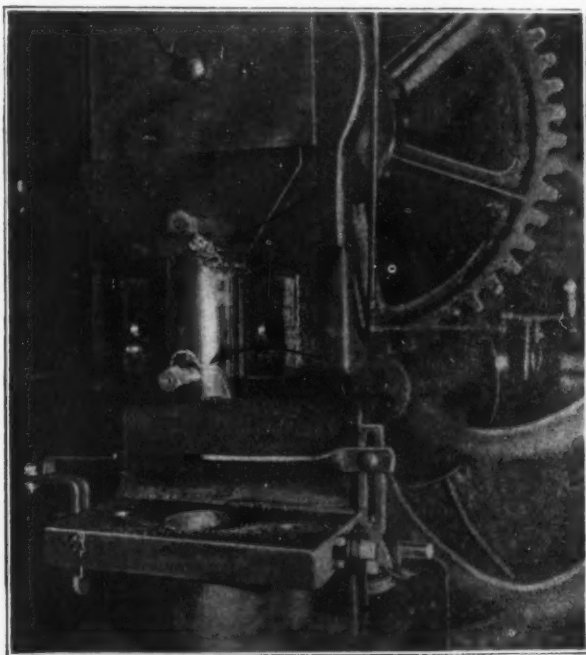


Fig. 1.—A Broken Press Ram Welded with an Oxy-Acetylene Blowpipe.

sure of almost any dimensions can be effectively welded in place of riveting; broken steel shafts and other forgings repaired; cast iron welded with copper or steel, and blowholes and similar defects in castings and forgings made good.

A typical instance of what can be done with this apparatus in repairing heavy castings by welding and replacing metal is illustrated in Fig. 1. The ram of the press had been so fractured that it was utterly useless. To replace the heavy part would have been expensive, for the machine was old and a special casting would have had to be made and machined. The die end of the ram, 6 in. in diameter, was broken off for a third of its circumference and 4 in. upward. The part was hollow, being bored out to receive the shank end of a die that was held in place by a 1-in. set screw which was included in the fracture. The casting was about 2 in. thick. A fracture had also developed at the shoulder of the ram, a genuine crack that had probably resulted from brittleness caused by crystallization of the metal under constantly repeated shocks. The machine was taken down for convenience in the welding of the ram, and because it would be necessary afterward to return and rebores it and drill and tap the set screw hole.

No attempt was made to replace the pieces that had been broken off at the die end of the ram. The metal was replaced with steel by means of the blowpipe. The operation was typical of the general process. The fractured surface was first heated to melting point and then thoroughly cleaned of oxides. The initial heating is somewhat slow, because the metal by its conductivity absorbs heat rapidly, and until the whole is thoroughly heated the full effectiveness of the blowpipe in welding cannot be realized. The surface being cleaned and at melting heat, the operator takes the blowpipe in one hand and a steel rod in the other and begins the work of building on the new metal. The rod used in this work is about  $\frac{1}{4}$  in.

The flame keeps the surface at melting heat and at the same time fuses the steel rod, which acts like a stick of solder under the intense flame. The process is continued, the steel building up weld upon weld until the part is replaced.

In this case the first steel applied was of high carbon, because the cast iron was high in carbon, thus affecting a more perfect union of the two metals. But after a surface of high carbon steel had been obtained a softer steel was used for the remainder of the work. A part so repaired shows no trace of the weld when machined. The ram repair was completed in about seven hours, but this included the long preliminary process of heating the casting. The crack of the shoulder of the ram was merely filled with steel, the general process being similar to that just described. The surface was heated to the melting point, cleaned of oxides as thoroughly as possible and the metal melted in, running down into the crack, and then overlaid to give still greater strength. The repair was not machined, because nothing but appearance called for it and that was unessential.

Another interesting repair, of which no photograph exists, was the welding together of the broken parts of a thick casting. One side of the frame of a press was fractured entirely across at the throat. The casting was  $1\frac{1}{2}$  in. thick, with reinforcement at the front 3 in. thick. It was necessary to make a weld of that thickness and 12 in. long. The metal was first chipped away along the fracture, forming an obtuse shallow V, focusing on the fracture. It was impossible to satisfactorily remove the metal on the inside of the frame, because the space was too limited to swing a hammer, but some metal was chipped away from the inside, and it was easy to operate the blowpipe on this surface. A thickness of  $\frac{3}{4}$  in. was left at the crack, a depth of metal well within the limits of action of the flame. The steel was then filled in as has been described, and slightly beyond the surface of the casting. The frame was as good as ever for practical use, and the expense was slight as compared to the cost of replacing the frame.

The repair job shown in Fig. 2 is of another class, that of light castings. An automobile gear case from  $\frac{3}{8}$  to  $\frac{1}{2}$  in. thick had been broken into three pieces; the large part carried the main axle, another the driving shaft, and the third was a small piece about 3 x 5 in., which was

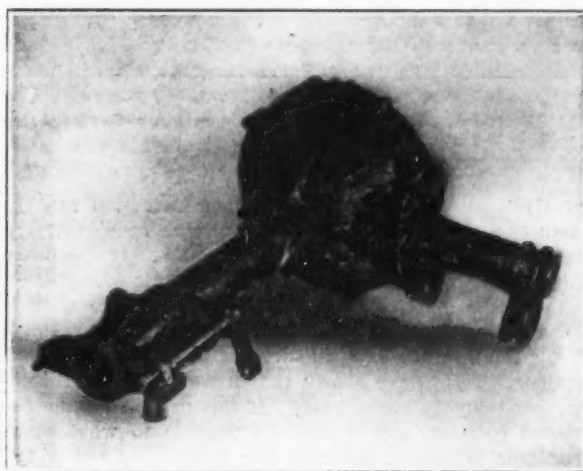


Fig. 2.—A Repaired Automobile Gear Case that had been Broken into Three Pieces.

lost. A casting from a plaster pattern was made to replace the missing piece, and the three parts were then welded together by the blowpipe flame. The case would have cost about \$80 to replace and three months' time to procure it. The welding was accomplished with a delay to the owner of one day and at a cost to him of \$12.50.

Another application of the blowpipe is in the treatment of defective automobile crank shafts which would otherwise have to be scrapped. Flaws develop in the forgings, consisting of holes from  $\frac{1}{8}$  to  $\frac{3}{8}$  in. deep and from 1 to 3 in. long. These holes are filled in with the same grade of steel as the forgings, usually nickel steel. Small strips are melted with the flame after the repair.



have been cleaned away, and when the work is done the forging is as if it had never possessed a flaw, for a homogeneous piece of metal has been formed. Shafts so corrected are shown in Fig. 3.

Any shaped hole can be easily cut in steel plates up to 6 in. thick, as with the blowpipe the operator can accomplish cutting feats impossible with a saw. In cutting, the flame is proportionately elongated by pressure to penetrate to the bottom of the cut. The intense heat is so localized that the kerf is practically the same as if a saw were used.

The Worcester Pressed Steel Company has accomplished some difficult autogenous welding with aluminum, practically overcoming the trouble from the oxide which forms on the surface of aluminum when exposed to the atmosphere. Although aluminum melts at a com-

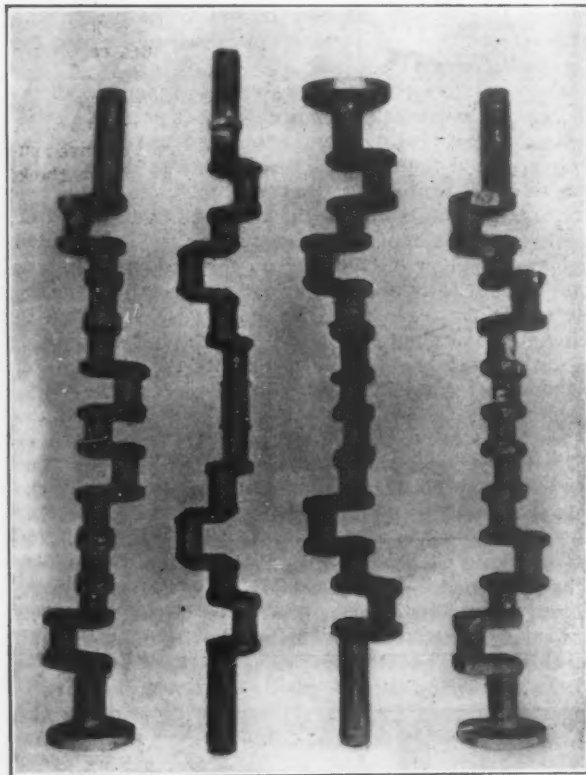


Fig. 3.—Broken or Defective Automobile Crank Shafts After Welding.

paratively low temperature (1200 degrees F.), it rapidly conducts and absorbs heat and requires a comparatively high local heat to obtain the best results. It has been learned that by cleaning the surface while it is subjected to the flame and instantly covering the surface with a nonoxidizing alloy of aluminum which has a strong affinity for the pure metal, such surfaces may then be welded together. Tests have shown that a weld such as this is stronger than the metal itself. If this process can be developed commercially it will be possible to weld sheet aluminum tanks and other similar receptacles and parts, replacing cast metal. With the demand for extreme lightness in aeronautics and other applications of the combustion engine the advantage of welding aluminum will readily be seen.

The Niagara Forged Steel Company, Buffalo, N. Y., has increased its capital stock from \$50,000 to \$100,000, and has purchased a plant at Depew, a manufacturing suburb, located on the Lehigh Valley Railroad. It is equipping the new plant for the manufacture of railroad specialties—brake beams, truck frames, bolsters and other car forgings—and also for the production of open hearth steel and castings. In addition to the two-story brick factory building and machine shop now on the property the company will erect a steel frame building at once for the open hearth department. A branch company has

also been organized at Toronto, Canada, to manufacture the same line of railroad specialties.

### Capital in Canadian Manufacturing.

TORONTO, July 6, 1907.—A bulletin issued by the Census and Statistics Bureau of Canada on the subject of the country's manufacturing industry has reference to the capital employed. The two previous bulletins giving manufacturing statistics for the same quinquennial period (1900 to 1905) related to the value of output by localities and to the value of output by products. In the first of these it was shown that the output in 1905 amounted in value to \$715,035,000, as against \$491,053,000 in 1900. According to the bulletin which has now appeared, the capital employed in Canadian manufactures has increased from \$446,916,487 in 1900 to \$843,931,178 in 1905.

Large as was the increase in the value of the country's output in the period, it did not keep pace with the increase in the capital applied. Whereas in 1900 the capital engaged was \$446,916,487 and the output was \$481,055,375, in 1905 the capital engaged was \$843,931,178 and the output \$712,664,835—that is to say, in the earlier of the years compared the manufactured output amounted to \$34,138,888 more than the value of the capital then invested in manufactures; in the later of the years compared the capital involved amounted to more than the value of the output for that year by \$131,266,343. This change in the ratio of output to capital is ground for satisfaction rather than otherwise, though according to some commentators it is a thing to be regretted. Clearly the ratio in 1905 was more normal than in 1900. There must be some imperfection in a country's manufacturing organization when the output of a single year is worth more than the purchase price of the whole of the country's manufacturing plant and equipment. The real explanation of the difference lies in the fact that the country's manufacturing outfit was brought from quite a backward state in 1900 to one of greatly increased efficiency by 1905. In the former year there was an overwhelming business for a plant in a state of unpreparedness for the era of prosperity that had by that time set in. In 1905 the adjustment of manufacturing capacity to the requirements of the country's expanding trade was more or less completely effected. By the beginning of the century Canadian manufacturers, though much encouraged by the healthy state of trade of the three or four years they had just passed through, had not acquired the confidence that they have since gained. They had not yet become fully accustomed to prosperity or assured as to the chances of its continuance. They were warned by experiences in the early nineties against the danger of venturing out boldly. More than that, money could not so easily be enlisted in manufacturing enterprises as it could afterward.

In 1903, 1904 and 1905 there were on all hands evidences that this doubt and hesitation were at an end. These years and subsequent ones were characterized by a great growth in the country's manufacturing capacity. New factories sprang up in all the industrial centers of Canada, and nearly every manufacturing concern added to its plant, and in most cases increased its buildings. Further, the new works were much more substantial and much more costly than the old ones. It was manifest that the manufacturing enterprise of the country had become animated by a new spirit. Money was liberally applied to plant and buildings, instead of as before being stinted in these applications. Manufacturers were no longer afraid to put up works on the assumption of a long lease of good times. There is reason to believe that the industries possessed by the country in 1905 were better worth the total valuation of the Census Office put upon them than were those possessed by the country in 1900. The new industries, as has been said, are substantial; they are equipped for elaborations and for progressive transformations, of which there was little promise ten years before. In 1900 there was much more crudeness, and many concerns with practically no plant were then counted as manufacturing businesses. Production has not fallen off. It has simply had a better foundation of capital supplied to it.

C. A. C. J.



### Scaife Mechanical Filter Strainers.

Mechanical filters are distinguished from the sanitary or slow sand filters by the use of a gelatinous blanket formed by the action of the coagulant on the filter bed, by the method of washing the filters, and by the higher rate of flow through the filter bed. To have an efficient mechanical filter it is absolutely essential that proper provision be made for washing it, which means breaking up the sand bed to carry off the collected mud, silt and bacteria. There are many devices for breaking up a filter bed to enable the wash water to carry off the mud, &c.—mechanical rakes which agitate the sand bed during the washing process—*i. e.*, when the flow of water through the filter is reversed; air agitation combined with the water, or air introduced separately, as desired, and an efficient strainer.

In most cases no other means than the pressure of the water from the strainer need be used in the washing process, and it is all that is necessary under ordinary conditions if the strainers are properly designed and distributed. In all cases it is very important that an effi-

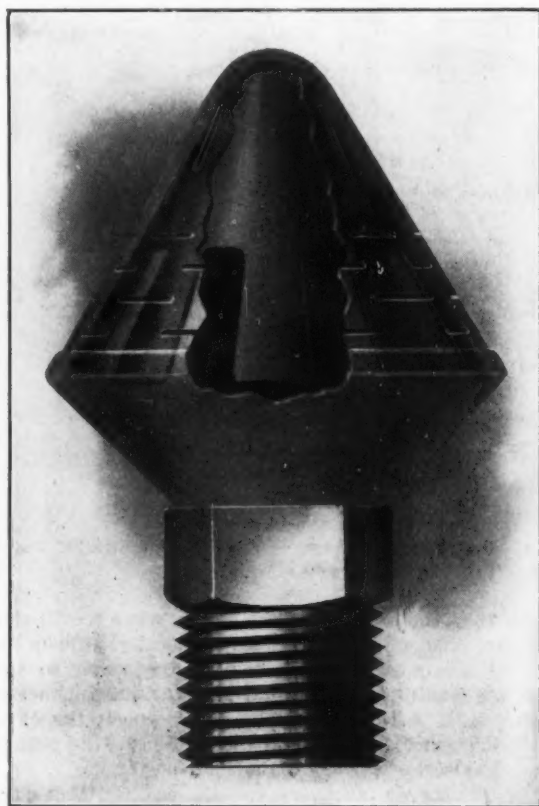


Fig. 1.—Mechanical Filter Strainer Made and Used by the Wm. B. Scaife & Sons Company, Pittsburgh, Pa.

cient strainer be used to bring perfect distribution of the wash water to all parts of the filter bed, no matter what devices are used in connection with it. Of the many strainers that have been put on the market most have been circular disks of perforated metal, the perforations being either round or narrow rectangular slots. In the ordinary operation of the filter this type of strainer gives satisfactory results, that is, it prevents the sand from passing out with the filtered water, but when it becomes necessary to reverse the flow of water to wash the sand bed a very great quantity of water is required and little or no velocity is obtained, due to the size and number of the openings in the strainer.

It is important in washing a filter that the wash water have a high velocity. This is hardly possible with the ordinary type of strainer, such as is generally used, because such a large number of them are required to give sufficient flow of the effluent from the low head in the filter. With the majority of strainers the area of the openings is many times larger than the area of the supply line which carries the water for washing the filter. The small perforations in the strainers cause a great

deal of friction, and the area of these perforations must be very much in excess of the actual area of the pipe outlet from the filter, in some cases as much as four or five times as great. This being true, an enormous quantity of water must be introduced to get an appreciable velocity, and even then it is difficult to get a jet sufficient from each strainer to give a thorough washing.

The patented strainer illustrated in Fig. 1 is a radical departure from those generally in use. It consists of an inner and outer cone, the inner cone being movable and of such shape that the openings in the outer cone are partially closed off when washing. The number of openings which are closed off can be adjusted in each



Fig. 2.—The Scaife Mechanical Filter Strainer in Action.

particular case, so that the area discharging water into the filter bed can be accurately adjusted to the size of the washout pipe. The inner cone is held in place when washing by the pressure of the wash water, as the stream entering the strainer strikes the closed portion of this cone, thus holding it firmly in place. This strainer has an ample area of openings to deliver the filtered water, but when washing the inner cone reduces the area of the slots in the outer cone, so that the combined area of all the strainers is a little less than the area of the pipe through which the wash water is introduced. In this way a uniform pressure may be maintained in each individual strainer to give a high velocity of the wash water through the openings of the strainer. The latter are arranged to give a radial discharge, thus insuring a thorough washing of every part of the sand bed. Fig. 2 gives a very clear indication of the action of the water being discharged from the strainer.

These strainers are used in the water filters and also in the filters used with the Scaife and We-fu-go water softening and purifying systems manufactured by Wm. B. Scaife & Sons Company, Pittsburgh, Pa.

The Ralston Steel Car Company, Columbus, Ohio, will begin work in about 30 days on a large addition to its plant, which will be used for the manufacture of under frames and box cars. The addition will be 400 ft. long, two stories. The company is now erecting a planing mill, which will be completed about August 1, and has prepared plans for a large office building on which work will be started soon. At the annual meeting of the company, held a few days ago, W. G. Bowland declined a reelection as secretary and treasurer and E. S. Colver, who has been assistant secretary and treasurer, was elected in his place.

## Some Late Improvements on Compressive Riveters and Other Tools.\*

BY CHESTER B. ALBREE.†

Among compressive riveters there are two or three quite familiar types, the oldest being the straight hydraulic machine invented by Tweddel in England, and later the pneumatic riveter by Allen of New York, who was perhaps the first to make it a success. Later came the hydropneumatic riveter. With the latter the author's company has experimented, seeking to obtain greater economy of air, simplicity of construction and better action.

The pressure required for driving rivets is different than that for punching materials; in the latter the greatest pressure is exerted as the punch encounters the material, while in the former, and especially hot riveting, little work is done when the die first strikes the rivet, the greatest pressure being required to finally form the head. Clearly, therefore, a constantly increasing pressure is the theoretically correct one for driving rivets. This is most easily obtained by a toggle joint, which theoretically gives an infinite pressure with an infinitesimal movement at the end of the stroke. In practice an infinite pressure is not obtained, but as most riveters are of horseshoe or yoke type the limit pressure is the yielding or bending point of the frame.

The general idea of a straight toggle joint machine is shown in Fig. 1. In practice it is found that when the cylinder has made seven-eighths of its stroke the pressure in line with the rivet dies rises to about 15 times the pressure in the cylinder. By that time about 1-16 in. of the stroke remains, and beyond that point the yoke would probably spring. If the yoke were made strong enough not to spring at all, it would be unmanageably heavy; it is only necessary that deflection should not occur at a pressure below that necessary to drive the rivet. Hence the toggle joint arrangement is the best possible for driving rivets.

There are, however, certain drawbacks in the practical application of the toggle pressure, the principal one being that for a given leverage its stroke is absolutely fixed. In riveting the thickness of plate may be 1 or 2 in., or only  $\frac{1}{2}$  in., and that the maximum pressure may occur just as the die reaches the surface of the plate, it is necessary to adjust the distance between the die and the point of maximum pressure by a hand actuated screw. In work that does not vary this makes little difference, but in ordinary structural work and boiler work different thicknesses of material are common, requiring frequent adjustments, that call for a certain amount of skill, for if not done correctly the rivet will not be driven sufficiently tight.

To eliminate the need of adjustment the hydro-pneumatic machine was devised, which is practically a hydraulic intensifier. The ram alone gives a very small but powerful motion, and it is necessary in riveting to clear angles, stiffeners, &c., so it is desirable to have a longer stroke. High pressure is not needed over a longer distance than, say,  $1\frac{1}{4}$  in. The remaining problem, how to get a clearance movement, was solved by putting a little extra cylinder below the air cylinder. The air pressure acting on its piston forces liquid into the ram cylinder at low pressure, and thus 3 or 4 in. of preliminary adjustment is obtained.

Objections to this form are that it is very difficult to pack, and that to get 2 in. of die motion with a maximum pressure of 50 tons requires a 15 to 20 in. stroke in the air cylinder and a very high pressure throughout this stroke in the ram and plunger cylinders sufficient for the final closing pressure, thus wasting power. The practical advantage is that skilled workmen are not required to adjust the dies; they adjust themselves.

To get the desired toggle joint effect and yet have an automatic adjustment an interesting device was finally developed at the Chester B. Albree Iron Works. In Fig. 2 is shown the first attempt and also the perfected form.

\* Abstract of a paper read before the Engineers' Society of Western Pennsylvania.

† President the Chester B. Albree Iron Works, Pittsburgh, Pa.

The toggle joint action is practically the same as in the first machine described. The pressure from the toggle is transmitted from the large area of the plunger to the top of the ram and also through a pipe to the adjusting cylinder. The ram, being smaller in area and free to move, advances more rapidly than the plunger and continues until the rivet die strikes the rivet. As the plunger continues, the pressure in the cylinder is limited by the pressure due to the spring in the adjusting cylinder, which is only 20 lb. per square inch, insufficient to upset the rivet beneath the ram. Hence the liquid will now displace the piston in the adjusting cylinder, the ram remaining stationary. As soon, however, as the projection on the plunger enters the ram cylinder the full toggle pressure is transmitted through the incompressible liquid to the ram, forcing down the rivet, and the differential area above causes the liquid remaining in the large plunger bore to be forced into the adjusting cylinder.

During the downward movement of the ram the liquid beneath it is forced into the opposite end of the adjusting cylinder, against the spring pressure. Obviously, the ram may move its whole adjusting stroke, or none at all, up to the time that the projection on the plunger enters the smaller area, after which the further travel of the ram is that of the plunger, until the ram meets opposition

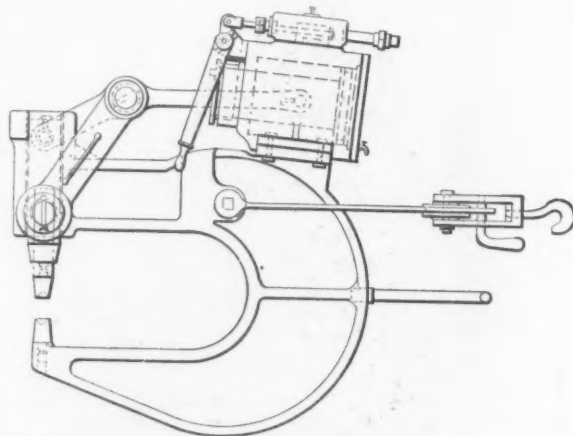


Fig. 1.—A Pittsburgh Riveter, an Example of a Straight Toggle-Joint Machine.

greater than the pressure of the toggle, when it will stop. This arrangement, therefore, automatically adjusts the point of maximum pressure to suit the work, so that rivets are equally well driven through various thicknesses, as illustrated in Fig. 3. On the return stroke the direct pressure beneath the ram and the suction of the plunger serve to raise the ram to its original position.

This design worked very well indeed for about two strokes, but at the end of the second or third stroke the packing was gone and it was impossible to hold the pressures. The trouble lay in the fact that cup leathers were put at the end of the plunger, and when these entered the chamber the ensuing high pressure tended to cut the leather out. Leather cups hold better than any other hydraulic packing, and to retain their use it was necessary to so arrange them that they would always be surrounded by the cylinder walls and never pass ports. The problem was complicated by the need to allow the liquid to pass freely from the upper to the lower part. The solution is indicated in the detail of the later form shown in Fig. 2.

It will be seen that the extension of the plunger when up projects into the smaller area of the ram cylinder and that cup leathers are used to pack it. In the interior of this extension is a poppet valve having a stem, the upper end of which carries a small piston. This valve is normally held open by a spring. When the pressures above and below this small piston are equal the spring holds the valve open, but when the pressure below is the greater the piston will move up, closing the poppet valve. This occurs only when the port M, leading into the space below the small piston, is closed, due to its passing from the large diameter bore to the smaller ram bore. When closed the toggle pressure acts on the liquid

below the plunger extension, raising the pressure sufficiently to move the small piston and connected valve, and later exerting very high pressure on the poppet valve, shutting it perfectly tight. The adjusting action is the same as in the first type, except that the liquid flows through the ram extension instead of around it during the adjustment part of the stroke.

In any device of this kind there is always a certain loss of liquid. It was therefore necessary to provide a

a vacuum in the plunger cylinder, and then the check valve will open and oil flow out of the compensating cylinder, under the pressure of the spring acting on its piston, to replace that lost.

#### Pneumatic Hammers.

The Chester B. Albee Iron Works has also been working on pneumatic hammers, and has perfected one having one or two novel features. In pneumatic hammers of

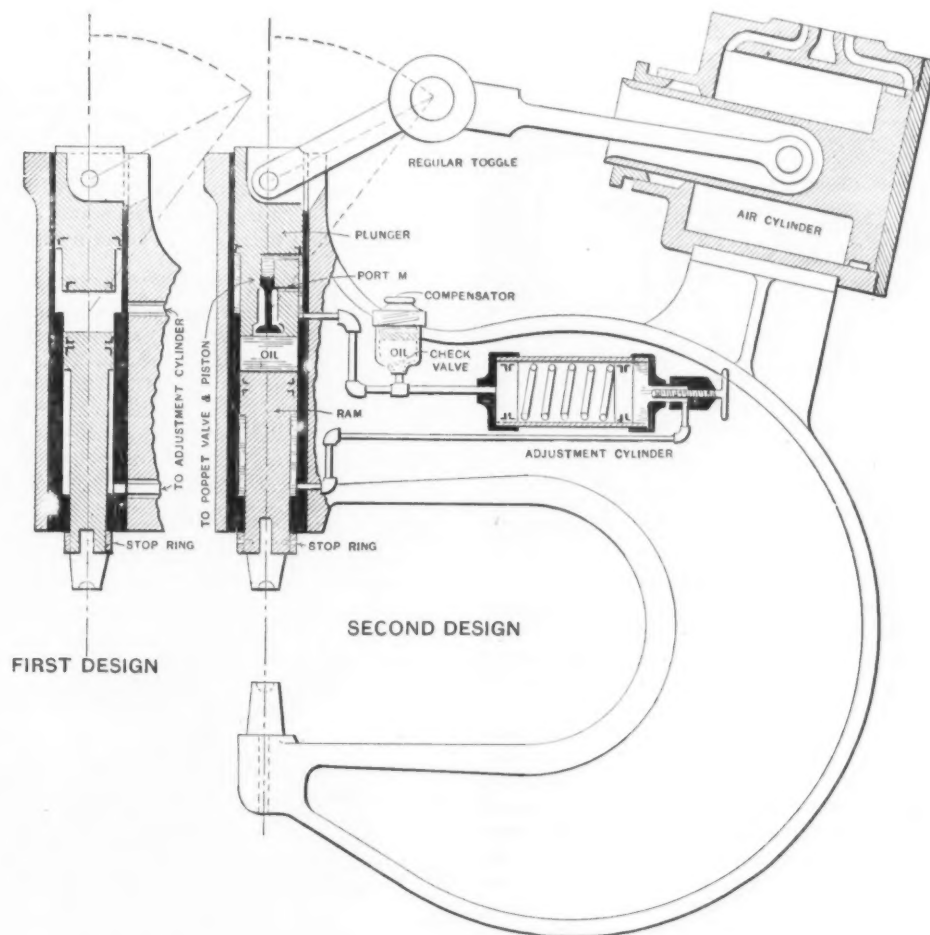


Fig. 2.—The Hydro-Pneumatic Riveter Developed by the Chester B. Albee Iron Works, Pittsburgh, Pa.

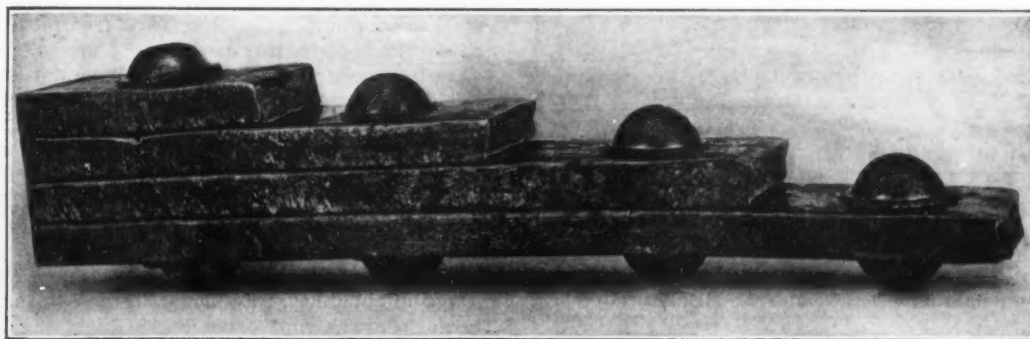


Fig. 3.—Riveting Through Various Thicknesses Possible with the Hydro-Pneumatic Riveter.

source of constant supply, so arranged that when the pressure rose in the confined liquid it would not blow out, but when there was a vacuum in the system additional liquid would run in. This is taken from a small storage, or compensating, cylinder full of liquid, having a piston with a spring behind it, connected to the larger bore of the plunger by a pipe containing a check valve. When there is pressure in the plunger cylinder the check valve remains closed, but when the toggle is fully back and the piston in the adjusting cylinder is against its cylinder head, so that no pressure due to its spring is exerted on the liquid, any loss of liquid will tend to create

nearly all makes, one source of trouble has been that operation (accidental or otherwise) of the hammer when there was no chisel or rivet set in it would allow the piston to strike the cylinder head, and soon smash the piston or cylinder. About 75 or 80 per cent. of the breakages of pneumatic hammers is due to carelessness of that sort.

To obviate this trouble a very simple method has been devised, shown in Fig. 4. The admission port is located near but not at the end of the larger cylinder bore. When no tool is placed in the end of the hammer the lower end of the large piston passes and closes the admission



port, thus preventing air from acting upon the differential area to lift the piston. Any compressed air below the large end escapes to the exhaust by a small leakage port which is only open when the admission port is closed. In hammers actuated by valves exterior to the piston it seems impossible to use this device, and attempts have been made to mechanically close such valves, but they do not appear to be very successful. The same effect is obtained, but at the expense of loss of air, when the leakage port is designed to open when the piston is at the extreme end of the stroke, but does not close the admission port. Patents are now pending for these improvements. This simple device is very effective, for even if

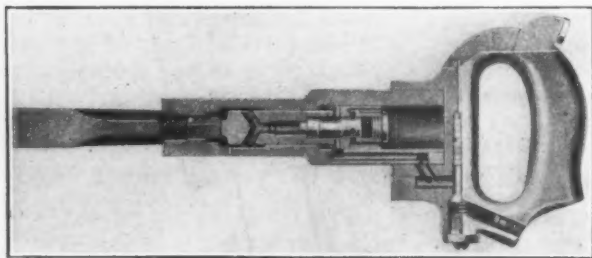


Fig. 4.—The Albree Pneumatic Hammer.

the throttle is opened, by pressing the trigger with the finger and there is 100 lb. air pressure in the pipe, the hammer does not start unless the tool is properly in place.

#### A Special Riveter.

Another machine of some interest was built for special work—the riveting of concrete mixer drums which were in the shape of two cones placed together. The problem was to reach into a very limited space and drive the rivets. The work had been done by hand with a pneumatic hammer, but something a little quicker, capable of driving tighter rivets and operated by power, was wanted. A reach of some 50 in. was necessary, and the opening was extremely small. At the same time it was necessary to be able to adjust for different thicknesses of material, and to give what is called an alligator motion to the jaws of the machine. The ordinary riveter could not be

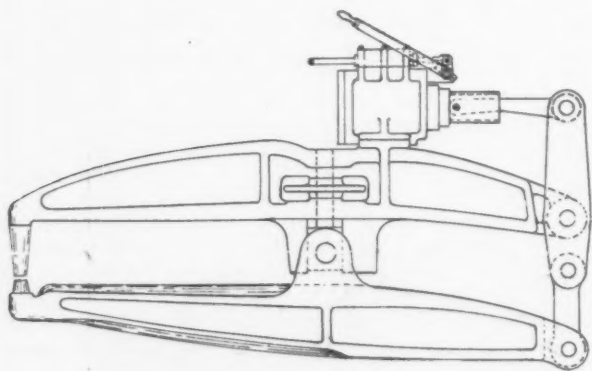


Fig. 5.—A Special Riveter for Working Through Small Openings.

used for this work. To secure adjustment of the projecting alligator jaws of the machine a screw was inserted, carrying the trunnions of the fulcrum on one end. A hand wheel, with a thread in the hub, served to raise or lower the screw, thus adjusting the distance between the ends of the jaws as desired and without interfering with their clearance or action. The details of the machine are indicated in Fig. 5. It is provided with a universal bail, so that it can be used in any plane at any angle. A special carriage was also designed to hold the double cones, rendering it unnecessary to raise either riveter or cones, but only to revolve the cones on their axis.

A somewhat similar scheme was employed in a horizontal method of riveting boilers, a description of which

was published in some of the technical papers.\* A wheeled truck was made, carrying on its bed three sets of rollers running the opposite direction. A riveter large enough to do boiler work was suspended from a trestle by a bail attached through a system of sheaves and tackles to a counterweight of one-fourth the weight of the riveter and four times its travel. Then a small chain block on the trestle was all that was necessary to overcome friction of the sheaves and tackle. In that way this machine could be raised with a chain block for any diameter of boiler.

A machine of this sort, with a 10½-ft. gap, weighing about 25,000 lb., is now in successful operation, and several other machines are being installed. The scheme has several advantages over the ordinary Tower system. It takes up much less room and the initial cost of installing the plant is much smaller. This system requires no hoisting of the boiler, as it is simply rolled on the floor or on the rollers. Thus the power plant of the machine is limited to that necessary to actuate the toggle.

**An Unusual Bankruptcy Experience.**—George Pence, trustee in bankruptcy of the Janney Mfg. Company, Columbus, Ind., manufacturer of farm implements, has not only paid off the claims in full, but interest on the claims since due. In addition, he has accumulated a surplus and is puzzled to know what to do with this. It has been suggested that it be turned over to the preferred stockholders, who subscribed \$100,000 to bring the company to Columbus from Ottumwa, Iowa. The referee in bankruptcy has referred the question to Judge A. B. Anderson of the Federal Court at Indianapolis. George W. Caldwell of Caldwell & Drake, Columbus, bought the buildings, plant, patterns and patents and will continue to operate the foundry and factory. He will start with an order for 5000 feed mills for a large implement company.

The annual report of the New York Custom House for the fiscal year ended June 30 shows that the volume of business transacted was the largest in the history of the port. The importation of foreign merchandise reached the total of \$858,948,904, compared with \$734,644,503 the previous fiscal year, and \$679,230,510 two years ago. The exports of American merchandise for the year were \$609,755,029, as against \$595,417,061 the previous year, and \$511,140,988 for the year ending June 30, 1904. Foreign merchandise exported for the year showed a total of \$11,426,185, compared with a slightly larger amount the previous fiscal year. The duties collected aggregated \$218,843,371. A vast amount of merchandise was brought to New York from abroad for so-called "immediate transportation" to interior ports, where the goods were appraised and the duties collected.

The *London Times Engineering Supplement* states that the third attempt to smelt New South Wales iron ores was brought to successful completion on April 30, when the first pig iron was tapped at Lithgow from W. Sandford's large modern blast furnace. About 30 years ago two attempts were made, one at the Fitzroy Works, Mittagong, and another at Erskinebank, in the Lithgow District. The former was shut down in 1877 and the latter five years later, neither having been made to pay with the appliances then in use. As the locality where the modern works are situated is replete with coal and limestone, as well as iron ore, the enterprise would appear to possess the elements of success.

On June 19 some 60 members of the Institution of Civil Engineers (Great Britain) visited the Erith Works of Fraser & Chalmers, Limited. The various departments cover an area of several acres, and additional buildings are in course of erection at a cost of \$350,000 for the construction of Rateau steam turbines, the manufacture of which was the most interesting feature of the visit.

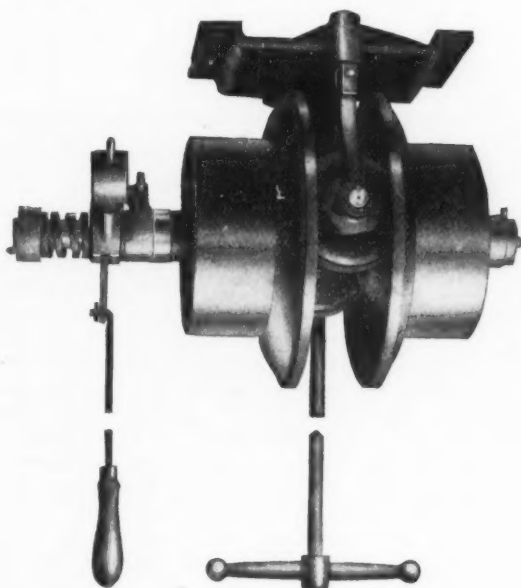
\* *The Iron Age*, November 8, 1906, page 1223.

### The Improved Cummings Speed Controller.

Several changes have been made in the speed controller and friction clutch made by the Cummings Machine Works, 11 High street, Boston, Mass. The device is a compact, simple, variable speed countershaft, in which a friction clutch is incorporated, making it possible to start and stop as well as vary the speeds of the driven machine, and in its new form is shown in the illustration.

The principal parts are two cast iron friction disks in whose inner surfaces are formed like annular concavities which, in section, are sectors of circles having their centers midway between the disks. The inner surfaces are specially treated to give a maximum of friction when in working contact with two interposed friction rollers having paper filled circumferences. The rollers are equidistant from the center of the shaft of the disks, and transmit power from the driving disk to the driven disk. Increasing the diameter of a roller's contact on one disk decreases it on the other, thus varying the speed on a double ratio. The rollers are mounted in vertical forks, the stems of which carry intermeshing segment gears so that rotating one produces a uniform but opposite rotation of the other. An adjusting pinion manipulated by a suspended handle meshes a gear on one of the roller fork stems, and, according to its direction of rotation, changes the position of the two rollers in the relation to the disks so as to increase or decrease the speed of the driven disk.

The disks are held firmly against the friction rollers, or released from contact with them by an axial movement controlled by a pendant cord and pull handle. One



The "Strong Pull" Speed Controller and Friction Clutch Made by the Cummings Machine Works, Boston.

pull engages the parts, putting the machine in motion; the next releases a powerful compression spring which retracts the disks from the rollers and allows the driven pulley to come to rest.

The "Strong Pull" speed controller, as it is called, may be adapted to an upright drill to take the place of the usual cone and back belt arrangement, saving belting and permitting a double table if desired, and similar advantages are claimed for it when used in driving other classes of machinery.

The New York *Journal of Commerce* says that the amount of new securities created in the first half of 1907 has never been paralleled. The grand total authorized is \$1,278,728,500. Already \$799,442,100 has been issued since January 1, leaving \$479,286,400 of this year's output to be sold in addition to a large carry over from last year. The railroads have asked for \$979,446,000, exclusive of \$252,000,000 announced by the Hill roads and the

St. Paul last December. Industrial corporations have asked for \$299,281,900. The feature of the year's financing to date has been the issuing of \$503,651,000 short term notes which pay from 6 to 8 per cent. to investors.

### The Gravity Mine Car Coupler.

The mine car coupler shown in the accompanying illustrations is made by the Gravity Coupler Company, East Peoria, Ill. Fig. 1 shows the position of the coupler



Fig. 1.—The Gravity Mine Car Coupler Connected.

when connecting the draw bars of two cars, and Fig. 2 the positions assumed by the parts when the coupler is disconnected. The couplers are permanently attached to the car and when uncoupled hang free and are not in the way when the car is hoisted or lowered in the shaft.

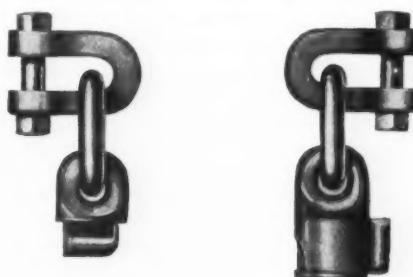


Fig. 2.—The Parts of the Coupler After Breaking the Connection.

The coupling parts are drop forged and are held together by a hook shaped tongue on one part, fitting into a corresponding slot in the other. The connection is made by slipping the parts laterally together when they are held against uncoupling by an eccentrically weighted collar on the female part of the coupling. The collar is cut away on one side to admit the hook of the male member, and when revolved so that the weight hangs downward closes the opening. When the weight is turned up the two sections are allowed to fall apart. Since the weight of the collar tends to remain at the bottom, it is claimed to be impossible for accidental uncoupling to occur.

When not in use the separated couplings depend from the car at a height that allows safe clearance above the rail and around switches and frogs, and, while out of the way, they are always ready for immediate service. The couplings are furnished for draw bars with either vertical or horizontal holes and are made in three sizes: No. 1 for light or ordinary work up to 30 medium cars per trip, this being the smallest size made; No. 2, strong enough to handle 50 cars per trip, and No. 3, for heavy work, including any practicable number of cars per trip.

The Maschinenbau-Actien-Gesellschaft, Hanover, Germany, has now delivered the 5000th locomotive built at its works, and a summary is published of the work done in the locomotive department since the works were founded in 1835. Of the 5000 locomotives constructed 1100 were for railroads outside of Germany, of which 241 went to Russia, 115 to Roumania, Japan coming next with 93, and 14 for the Argentine, the remainder being divided between European and Asiatic countries, and six to Chile. The especially interesting remark is made that none of these engines was sent to the United States.

Colné & Co., successors to Powell & Colné, 11 Broadway, New York City, have just closed the fourth contract with the Government for the installation of a steel casting equipment by the Tropenas converter steel process at the Mare Island Navy Yard, California. This firm has so far erected 32 converters.

# THE PROCESS OF COAL WASHING.\*

## DESCRIPTION OF THE APPARATUS EMPLOYED.

BY SAMUEL DIESCHER, SR.

The washing of coal began with the use of coke for smelting purposes, particularly in blast furnaces. In Europe it has been practiced about 75 years, because of the large amount of impurities in the coal mined there. Besides volatile matter and carbon, bituminous coal contains ashes and sulphur; both undesirable in the process of iron smelting. The ashes are partly slate and to a smaller extent are in combination with the pure coal. Some of the slate is separate and some attached to coal. It is impracticable to pick all the slate from the coal, as much of it is in too small pieces. The same is true of sulphur in the form of iron pyrites. As both these minerals are detrimental in the production of pig iron, means are necessary to eliminate them from the coal prior to its conversion into coke.

The wet concentration of various ores by means of hand screens was practiced centuries ago in European mines. Later the screens were enlarged and mechanically operated. Hence the art was already known when the use of coke in the smelting of iron ores was initiated and it was found that the European coal was not pure enough. The adaptation to coal of the means employed in concentrating ores was only a small step and thus came about the art of coal washing. By crushing the coal, before washing, to sizes not exceeding  $\frac{3}{4}$ -in. cubes, the slate and iron pyrites are split off and subsequent washing separates them sufficiently to afford good blast furnace coke.

Sulphur occurs in the coal in combination with lime, as gypsum, which is very difficult to eliminate by the washing process, because it tends to float, and also in combination with organic matter which cannot be removed by any mechanical process. The sulphur occurring as pyrites is largely roasted out in the coke oven, but the other two combinations remain with the coke. Another impurity in coal is what the miners call "bone."

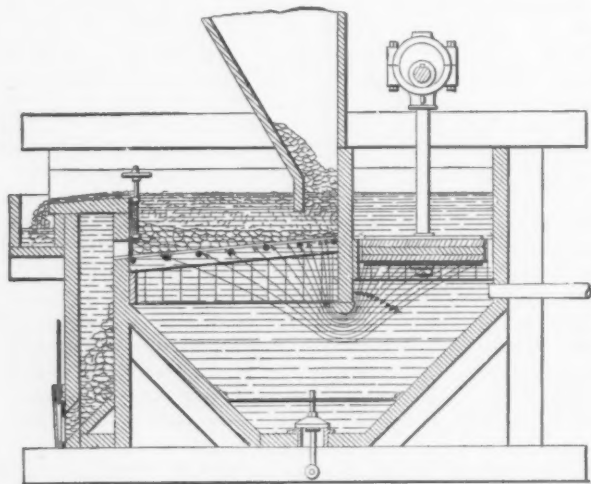


Fig. 1.—The Harz Jig as Applied to the Washing of Coal.

which is a combination of earthy matter and bitumen. Some mines contain much, others scarcely any. The nearer its specific gravity is to that of coal, the more difficult it is to wash out.

The more ashes and sulphur in coke the less its market value. With the content in ashes, increases also the quantity of limestone that must be put into the furnace. It takes 2 lb. of limestone for every pound of ashes in the coke, and then again it takes coke to melt that additional limestone. A little limestone must be added also to take up the sulphur in the coke, but still some joins the iron, making it red short.

\* Abstract of a paper read before the Engineers' Society of Western Pennsylvania.

Fortunately the extensive deposit of pure coking coal in Pennsylvania in the Connellsville region for many years satisfied the demand for coke for blast furnace use. Now, however, it is necessary to draw upon other localities where the coal is suitable after being purified. The first attempt in this country to wash coal was made in 1870, when a small washery was erected at Alpsville, about 24 miles from Pittsburgh. This plant washed slack from the local mines, and the product was converted into coke at the same place. It was built by a German mining engineer, John J. Endres, who, previously employed at Prussian Government mines, brought

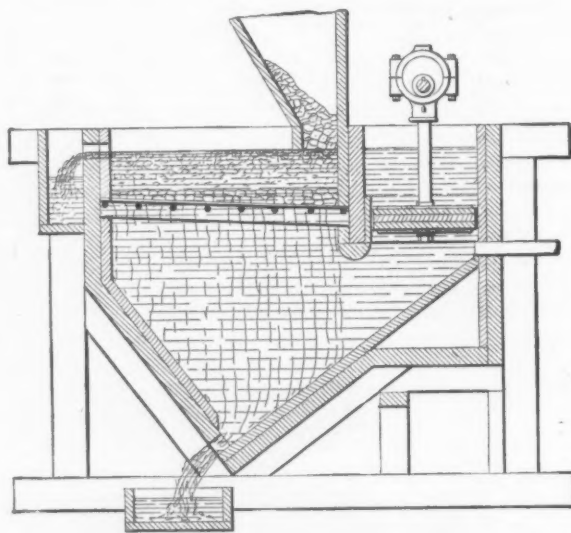


Fig. 2.—Lührig's Attempt to Improve the Harz Jig.

drawings and photographs with him and put them to use. During 1871 and 1872 he built several more washing plants; some in connection with so-called "Belgian ovens," that is, retort ovens, of the type used for utilizing the by-product from the coking process. These were built at Hazelwood and Holidaysburg, Pa., Irondale, Ohio, and Equality and Joliet, Ill. A purely washing plant was erected near Mansfield, now called Carnegie, Pa. Soon after the Alpsville plant was put into operation, two companies of St. Louis, Mo., erected extensive washing and coking plants at East St. Louis, Ill. All the plants named have since been dismantled, chiefly because of the panic from 1873 to 1879, when there was no market for washed coke, Connellsville coke being sold at 90 cents a ton at the ovens. During 1879 the iron and coke business renewed, and the price of coke rose from 90 cents to \$6 per ton. Consequently, for a couple of years, some demand existed for coal washing machinery, chiefly by the furnace companies maintaining coke works for supplying their own furnaces. During the last eight years the demand for coke has so increased that washing machines are now being erected at various places.

The washing process is based upon the difference in the specific gravities of the various minerals mixed with the coal as it is mined. These average:

Coal .....	1.3
Bone .....	1.4 to 1.8
Slate .....	2.3 to 2.7
Pyrites .....	3 to 5

If subjected to the action of a rising current of water the coal rises quickest, the bone next, then the slate, and finally the pyrites.

For many decades ore and quartz were separated in sieves submerged in water and jigged up and down until the quartz being the lighter collected on top and the heavy ore settled on the screen. Later on, larger screens were employed and suspended from counterbalanced over-



head levers or flexible rods, relieving the operator from holding the sieve. Still later the screens were driven by power. The next step was the invention of the Harz jig, Fig. 1, which originated in the mining region of the Harz Mountains in Germany. Originally it was used exclusively for concentrating ores, but was later adopted also for washing coal. This machine consists of a tank divided into two compartments near the top by a short partition; one contains a screen dipping toward the front, and the other a wooden piston operated by an eccentric. The front of the screen compartment is cut down below the other sides and provided with a shelf for the overflow to run out over. The water enters the tank through a pipe in the rear, below the piston.

The operation of the machine is as follows: After the tank is filled to overflowing the supply of water is continued and coal is admitted through the hopper at the rear of the screen. With every down stroke of the piston the water rises through the screen and lifts the coal and its impurities, gradually spreading them over the

attention required from the operator prevents his taking charge of more than four jigs. Some modern washeries have 20 or more jigs, necessitating five or more men to attend them. To provide an automatic continuous discharge for the refuse, the Harz jig was variously modified. It was supposed that the reciprocating piston would oscillate the water in the tank uniformly, but the main body of the water remains at rest and only that part displaced by the piston and supplied through the pipe is set in motion. This water chooses the shortest course, which is around the lower edge of the partition; therefore most of it passes through the rear half of the screen, near the coal chute. Proper washing requires uniform action of the water all over the screen. Too strong a current at the rear will not separate, but only agitate the material, and too weak a one at the front end does no work; there remains only a comparatively small section about the middle of the screen over which the work is properly done. This condition is aggravated by the further obstruction to uniform rise of the water due to the greater depth of the charge at the front and the accumulation of heavy refuse there. In short, the force of the current is greatest where the load is least, and least where the load is greatest.

Lührig undertook to remedy the evil by inclining the screen toward the rear, as in Fig. 2, so that the greatest depth and heaviest load came where the current is strongest. This would have been very good had a slate trap been located there, because the refuse travels toward that point, but instead he used a bed of feldspar all over the screen, made the holes in the latter large, and let the refuse drop through into the chamber below, to be removed by a continuous drain from the machine. On such machines all sizes of coal, up to above  $\frac{3}{4}$  in. mesh, were washed. The holes in the plates which formed the screen were 1 in. square, and the feldspar the size of walnuts. On account of the large holes and the coarseness of the feldspar a considerable quantity of coal gas goes with the refuse. An establishment using 16 of these jigs has three additional jigs for washing the refuse to save the coal it contains. There is also a Lührig's jig intended for washing coarse coal, which is the same as the Harz jig; that is, its screen inclines toward the front and it has slate grates there and uses no feldspar.

Fig. 3 gives a sectional elevation and plan of a typical modern jig. The characteristic feature is that the screen is narrow and long; it is never over 24 in. wide, but may be as much as 6 ft. long. The piston is of the same dimensions as the screen and is parallel with it. This jig may be used with or without a feldspar bed, in which latter case the refuse is removed at the overflow end of the screen. In either case the screen is level. If feldspar is used, the refuse drops through holes in the screen. Feldspar is advantageous chiefly in washing material from a  $\frac{1}{4}$  in. mesh downward, including dust. If used for larger sized coal the refuse must be washed to save the coal that drops through the screen.

The most rational way to obtain uniform action of the current is to locate the piston directly below the screen and make it practically of same dimensions as the latter. Fig. 4 gives a front elevation, plan and end section of such a machine. With this construction the screen may be of any size and shape and yet work uniformly as long as the piston is of approximately the screen's dimensions. This machine may be built with or without valves in its plunger. Without valves the water displaced by the down stroke of the piston passes into a secondary compartment and returns again with the rise of the piston. If there are two jigs in one tank the pistons work in opposition, one rising while the other descends, thus the water displaced by one fills the space vacated by the other. If the piston has valves, the water supply for a group of two or four jigs within one large tank is all led into a common compartment from which each jig draws its supply. The valves are either of steel plate or thin iron castings.

The periodical removal of the refuse collected in the compartment shown at the front of the Harz jig is a drawback, and is frequently obviated by employing a short conveying screw and a small elevator that continuously removes the refuse at the rate at which it is pro-

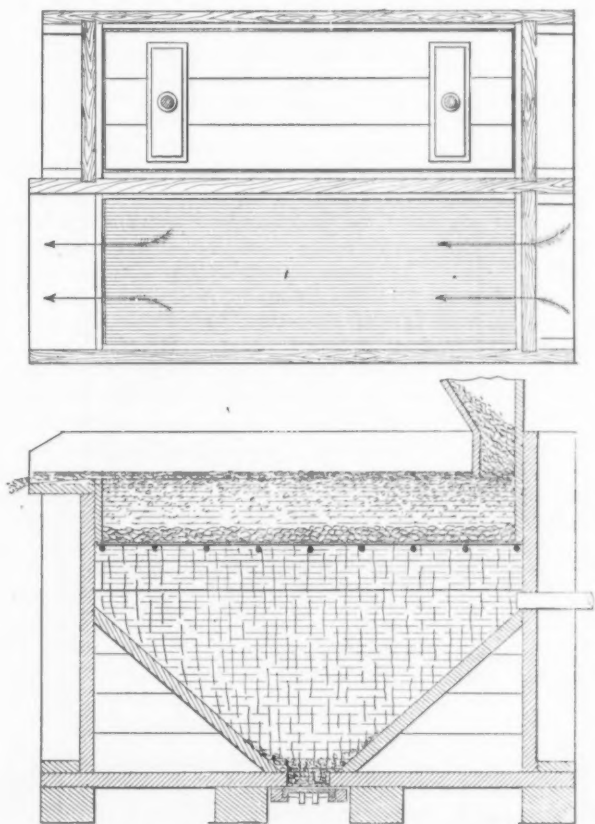


Fig. 3.—Plan and Sectional Elevation of a Typical Modern Jig.

screen until the space above is filled even with the overflow line. From then on, the washed coal is carried over the shelf by the current. While the material travels from the rear toward the front, the whole mass is lifted and dropped many times; with every upward movement the lighter bodies rise quicker and higher, and with every downward movement the heavier particles sink faster and lower, separating the materials in horizontal layers according to their specific gravities. The pyrites, being the heaviest, will lie directly upon the screen, the slate above it and the coal above the slate.

In Fig. 1 will be seen a gate attached to the inner side of the front of the screen compartment for discharging the refuse at periods of 5 to 15 min., depending upon the proportion of refuse in the coal. The refuse drops into the narrow compartment in the front below the overflow shelf, which holds approximately half an hour's accumulation, and is periodically emptied through another gate at the bottom. There is also a valve in the bottom of the tank, through which any fine material which drops through the screen is from time to time discharged.

It is obvious that opening of the refuse gate must be properly timed. If too infrequent the refuse may accumulate until it passes over with the washed coal; if too frequent coal is discharged with the refuse. The close

duced. One of the oldest devices for continuous and automatic refuse removal is shown in Fig. 5. It consists of an iron pipe, usually about 3 in. in diameter, that projects upward through the jig screen about 2 in., depending upon the size and average specific gravity of the refuse. It is adjustable through a threaded socket secured in the center of the screen, and is surrounded by a sheet iron cylinder, open at top and bottom, which is considerably larger in diameter and higher than the pipe, and is also adjustable in height to insure its greatest efficiency. As seen in Fig. 5, the adjusting is by screws and nuts which suspend the cylinder from an iron bar laid

Another device better adapted for coal is shown in Fig. 6. This is an oblong box, open at the top and bottom and provided with vertical sliding gates, about 5 or 6 in. wide, which are raised by the operator sufficiently to admit the refuse as fast as it is brought upon the screen with the coal. An iron baffle at the opening in the front plank accumulates the refuse until even with its upper edge, the additional refuse being discharged with every revolution of the eccentric shaft.

Fig. 7 is a section of a trap with two gates. Its feature is an overflow shelf projecting some distance into the screen compartment and provided with an adjustable gate equal in length to the width of the jig screen. Another gate, located where the refuse drops into the refuse compartment, or to a conveying screw and elevator, performs the function of a baffle. All these traps are based upon the same principle—namely, that sinking the lower edge of the cylinder in Fig. 5 or that of the gates in Fig. 6 or that of the cup in Fig. 7 a certain depth into the material on the screen leaves just opening enough for the refuse to enter the trap at the rate it is admitted with the coal. With every

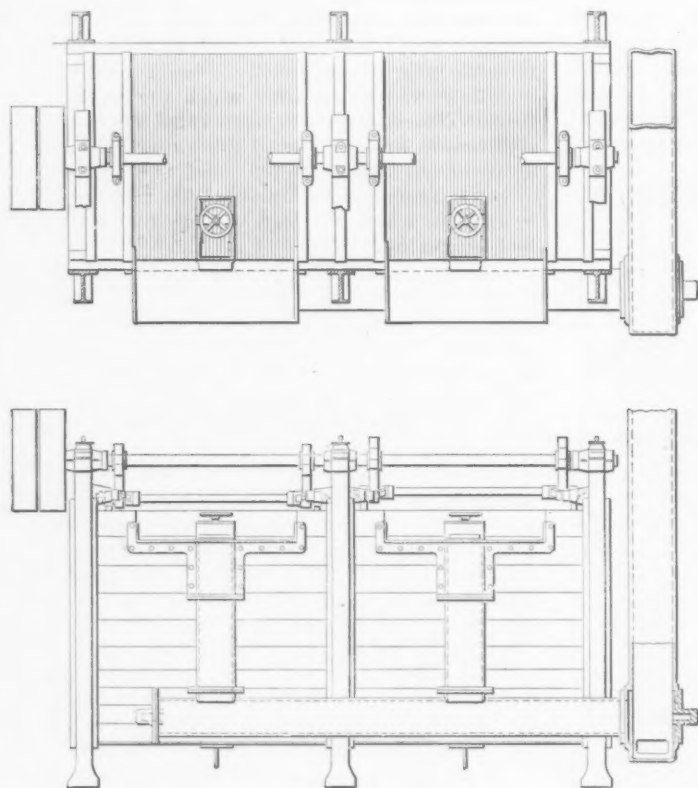


Fig. 4.—Plan, Front Elevation and End Section of a Double Jig Giving Uniform Action.

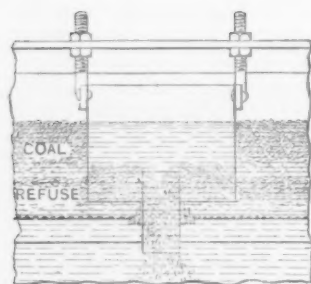
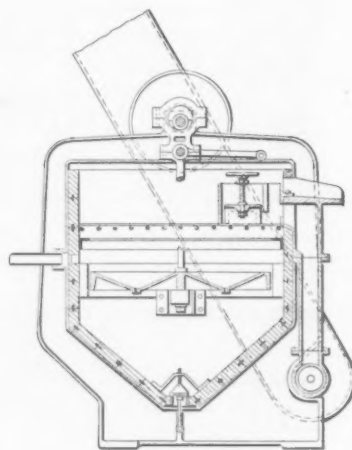


Fig. 5.

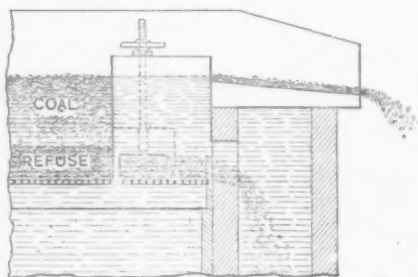


Fig. 6.

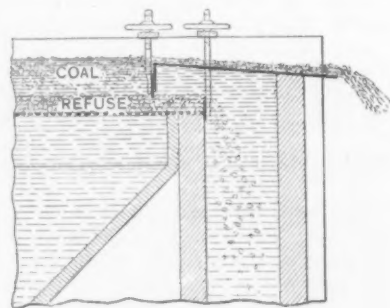


Fig. 7.

Details of Three Different Schemes for Effecting Automatic Continuous Refuse Removal.

across the screen compartment of the jig. The passage of the refuse between the lower edge of the cylinder and the surface of the screen is regulated according to the quantity to be discharged through the central pipe in a given time. The refuse drops into the space below the screen, whence it is removed either periodically or continuously in one or the other manner referred to before. With every upward current the refuse within the cylinder rises above the top edge of the pipe and as the particles toss each other laterally, a portion enters the pipe and is thus removed. This device is good for washing ore where the bulk treated is small compared with the quantities of coal that must go through a jig during a given time; for this reason it is not used much in the coal washing process.

upward current some of the refuse within the trap moves into the collecting chamber, or elevator, leaving insufficient to resist the lateral pressure exerted by the outer material, and thus while the latter sinks with the downward current, as much refuse will enter as has been discharged at the preceding rise of the material.

The device in the jig shown in Fig. 4 is larger than usual, because it is on a very large screen where a coarser and accordingly larger amount of coal is treated during a given time. For this reason the box is extended beyond the middle of the screen, because the coarsest and heaviest refuse drops earliest, and to forestall a detrimental accumulation of this heavy stuff a large gate is provided at that particular point.

A well working jig will wash about 4 tons of Pitta-

burgh coal per square foot of jig screen in 10 hr. The process is slower the more bone the coal contains, and the finer the coal must be crushed to separate the impurities preparatory to washing. It is an advantage to crush all coal to a certain maximum size, as, for example, to pass a  $\frac{1}{2}$ ,  $\frac{3}{8}$ , or  $\frac{1}{4}$  in. mesh. If there is no provision made for washing the fine coal, from  $\frac{1}{4}$  in. mesh down, in separate machines, it may be washed together with  $\frac{1}{2}$  in. or even larger coal, but only on a level screen; otherwise much of the fine coal is sucked through the screen whenever the current passes backward. A slanting jig screen, unlike a level screen, always has its highest part exposed, or uncovered by refuse. To save the fine coal that drops through the screen is not advisable, because much sulphur and fine slate is mixed with it and would impair the purity of the coke if saved.

The first washeries built in this country were very simple compared with the large modern plants established at some of the coke works in Westmoreland County, Pa., and elsewhere. Provisions for collecting and saving sludge, add greatly to the cost and complication of such plants, as does also the present tendency to place heavy machinery in the third or fourth story of a wooden building. Matters can be very much simplified by washing the fine coal separate from the coarser coal, and passing it over slanting draining screens, directly as it leaves the jigs. This does away with the expensive and trouble breeding sludge basins. The water can be used over after passing through a comparatively small settling tank having means for continuously removing sediment. In this case the coarse coal would be conducted directly into the elevator booth, and the water would flow back to the centrifugal circulating pumps, to be used over again.

The quantity of water used in washing coal is, if none is wasted and none used over, approximately  $1\frac{1}{2}$  gal. per minute for every ton of coal washed in 10 hr. Where water is scarce and must be used repeatedly, the continuous supply required is from 10 to 20 per cent. of the above amount. Water for washing coal should be renewed as often as conditions permit, for more or less sulphur and fine refuse is always suspended in it which is bound to affect the quality of the product. A great variety of conditions contingent to different localities have their influence upon the cost of construction of coal washing plants. Approximately a plant will cost from \$35 to \$50 for every ton of its washing capacity in 10 hr. Thus a plant washing 500 tons in 10 hr., at say, \$45 per ton, will cost \$22,500.

While the ratio of working expenses to traffic receipts is growing upon British and continental railroads, it is declining in the United States, due in part to the continuous betterment of the American roadbeds, and the use of heavier and more capacious rolling stock. The ratio in this country for 1896 was 70.43 per cent.; for 1900 it was 68.93 per cent.; for 1905 it was 67.49 per cent. Greater economy of working, and the practice of American railroads to get a larger amount of work out of each locomotive and car have been large contributors to these results. Coincident with this has been an almost steady decline in the rate of bond interest paid by American railroads, and a practically steady increase in the rate of dividends paid on the stock. Thus in 1896 the average bond interest was 4.45 per cent.; in 1900 it was 4.27 per cent.; in 1905 it was 3.79 per cent. Similarly, the total average dividends upon stocks in 1896 was 1.52 per cent.; in 1900 it was 2.44 per cent.; in 1905 it was 3.27 per cent. The decline in the average interest on bonds will be carried still further, as bonds bearing relatively high rates mature, and are either paid off, converted into stock, or refunded at lower rates.

A San Francisco press dispatch states that the electric iron smelting furnace operating on the Héroult process, at Héroult, on Pitt River, in Shasta County, Cal., has been started with 2000 hp. current. The success of the smelter, it is said, will mean much to the iron interests of California. There are large deposits of iron ore on Pitt River which could never be smelted in the old way because of the cost of coke.

## The Ferro Auto-Marine Engine.

As is generally known, two-cycle engines are built in two types, two-port and three-port. In the three-port type, the carburetor or mixer is attached to an intake pipe on the side of the engine and delivers its charge into the crank case through a port in the side of the cylinder, which is uncovered on the up-stroke of the piston. There are no valves or anything between the mixer and the crank case in this type of engine to get out of order and leak, or cause loss of the compression in the crank case. On the two port type the mixer is attached directly to the crank case with a check valve between it and the crank case. This check valve has the usual type of valve and valve seat in some cases, and in others a poppet valve which is likely to give trouble owing to the rapidity with which it is compelled to work, as it is expected to make twice as many openings as a valve of this type would on a four-cycle engine.

The Ferro marine engine built by the Ferro Machine & Foundry Company, Cleveland, Ohio, is a two-cycle, three-port engine. It is built in single, double and triple cylinder forms, which happen to be shown in Figs. 1, 2 and 3 respectively; these illustrations were selected more to show the features of construction in connection with the following description. The materials used in it are claimed to be of the highest grade produced for the automobile trade in this country. The crank shafts and connecting rods are made by the Wyman & Gordon Company, Worcester, Mass., and Cleveland, Ohio. These forgings are all made from one piece billet stock and contain no welds. The crank shaft is ground to limit gauges both on the bearings and on the crank pin. There is no turning down on these except to remove the outer surface. The connecting rod is of the marine type, clamped tight on the piston pin rod. The lower end is babitted with nickel babbitt, which is considered far superior to bronze on explosive engines.

The piston pin, which is a case-hardened and ground hollow tube of large area, is clamped in the upper end of the connecting rod and has its bearings in the sides of the piston. By this means the wearing surface on the piston pin is twice what it would be if the pin worked in the connecting rod. There is also the advantage of passing the lubricant from one side of the piston to the other through the hollow pin. The pistons are ground on the outside and are interchangeable. Four cast iron piston rings, ground on both sides and the outer surface, are used on each piston, three above the piston pin and one below.

The cylinders are made from air furnace iron, such as is used in motor cars, because it gives a closer grained, stronger, more ductile iron that will wear much longer than ordinary cupola iron. The cylinders are bored to size, drilled and tapped with jigs and fixtures so that they are interchangeable, and the pistons are lapped into the cylinders before the motor is assembled. The cylinder is designed for an effective distribution of water through the jacket, the greatest amount being forced to the top of the cylinder where the heat is greatest. The water is admitted through a cored opening in the side of the cylinder below the exhaust port, so as to be equally distributed around this port to keep it cool and reduce the liability of cutting due to excessive heat at this point. The water is exhausted from the cylinder through another cored opening, extending from the top to the side over the exhaust pipe, and into the latter to be delivered from its end into another exhaust outlet, if the exhaust is under water, or through an opening in the end of the exhaust pipe directly overboard without going through the muffler. This manner of delivering the water to and from the cylinder does away with piping and joints on the outside of the cylinder.

The pump is a horizontal type with a combination outlet and inlet valve which is an improvement over the type formerly used. The water is discharged directly into a cored passage underneath the crank case, and from this into the bottom of the cylinders, doing away with any pipe other than the suction pipe to the pump. The pump



is driven by a bronze eccentric rod long enough not to wear the plunger body eccentric.

The crank case is a one-piece casting with machined contact surfaces. The lower halves of the bearings in it are lined with nickel babbitt, and the upper halves are of bronze and are adjustable. This is one of the special features of the engine, as it is possibly the only two-cycle engine on the market with an adjustable main bearing.

The carburetor or mixer is of the company's own design and has as few adjustments as possible to give an accurate and economical mixture. There are no moving parts in the carburetor to get out of order or cause

of the cylinder directly over the travel of the hollow piston pin, so that the oil passes directly from this pin and lubricates both sides of the cylinder.

The ignition system uses an improved commutator the wearing parts of which are reversible, doubling their life. The spark is advanced or retarded by a conveniently located handle which is held in position by a spring latch. On this handle is a cutout button, by pressing which the motor can be stopped.

The engines are provided with ball thrust-bearings to take the end thrust of the propeller wheel and all of the bearing surfaces are large, so that under ordinary conditions there will be no necessity of making adjust-

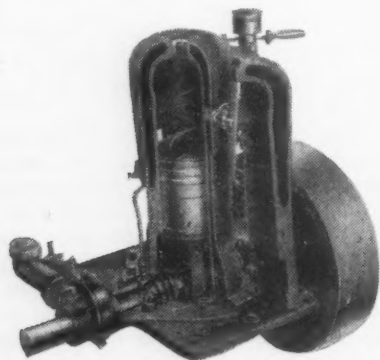


Fig. 1.—Single Cylinder Ferro Engine with a Quarter Section Removed.

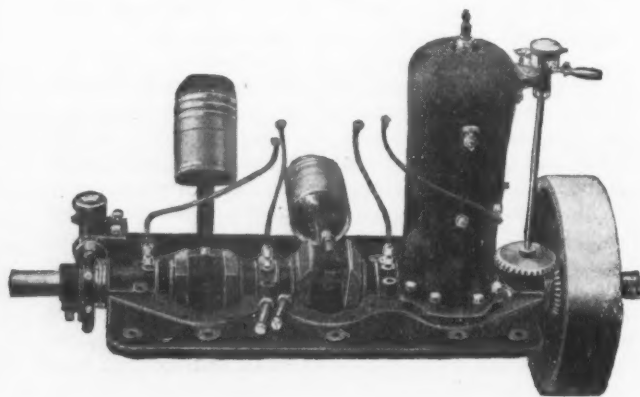


Fig. 3.—Parts of a Three-Cylinder Engine, Showing the Self-Contained Construction.

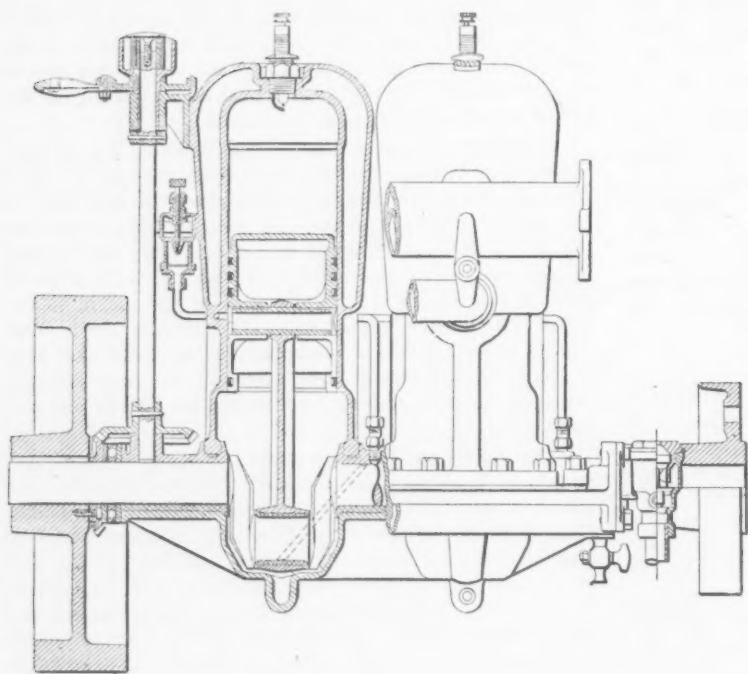
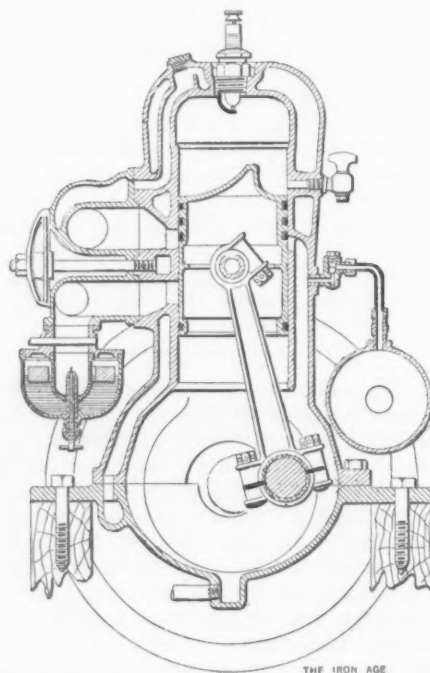


Fig. 2.—Elevations and Sections of the Two-Cylinder Marine Gasoline Engine Built by the Ferro Machine & Foundry Company, Cleveland, Ohio.



THE IRON AGE

trouble, and the only source of trouble will be through dirt in the pipes or water in the gasoline.

The lubrication system is of the pressure feed type, pressure being obtained from the crank case of the engine. From a large reservoir on the side of the cylinder, the oil is delivered to a series of sight-feed glasses on the end of the engine, each individually adjustable and connected by a separate pipe to the point it lubricates. The connecting rod on the crank shaft end is oiled through a hole in the crank shaft, the opening of which comes in close proximity to the main bearing oiler in such a position that there is always ample lubrication of the crank pin, and provision is also made for oiling it from splash in the crank case through a series of holes drilled in the bottom of the connecting rod cap. The cylinders are lubricated through an opening in the side

ments for one season's wear. The single-cylinder Ferro marine engines are made in sizes of from  $1\frac{1}{2}$  to  $7\frac{1}{2}$  hp. capacity; the double-cylinder engines in 7 to 15 hp. sizes, and the triple-cylinder engines in  $10\frac{1}{2}$  to 25 hp. sizes.

The McClure Company, manufacturer of tin plate, is making some changes in its plant at Washington, Pa. These include the remodeling of the furnaces and the addition of a 15-ton electric traveling crane, with 57-ft. span.

The H. C. Frick Coke Company is having two coking plants of 500 ovens each built on the Collier farm, west of Fairchance, and on the Phillips farm, Connellsville, Pa.

### Rolling Rails in a Universal Mill.

In a communication to the *Railroad Gazette* J. W. Schaub, Chicago, criticises the section for 100-lb. rails designed by Capt. Robert W. Hunt and makes interesting suggestions regarding rail rolling. He says:

"Captain Hunt says that this section is designed to overcome the imperfections due to the difficulty in making the metal fill out the thin flanges, which necessitates rolling the steel at a much higher temperature than would be necessary if the flanges were made thicker, as he proposes. This may be true, but the proposed section will not cure the difficulty. The trouble with the wide rail flange is in the delivery from the rolls, the angle made by the face of the flange with the axis of the rolls being such that true rolling action is impossible; so that, with the exception of perhaps one or two passes, the metal in the flange gets very little work other than the churning of the lower roll on the face of the flange. Moreover, if the defects in the flange are due to the high finishing temperature, why does not the head develop still greater defects, since the finishing temperature of the head is much higher than that of the flange?"

"The weakest part of the American rail has always been in the flange, in spite of the fact that the sections are unbalanced; that is, the center of gravity of the section is nearest the flange. In a paper read before the Western Society of Engineers, May 29, 1907, the writer called attention to the defect in the standard rail sections in this regard; but the proposed section is even a greater offender in this respect. In any beam subject to bending, the distance of the outer fibers from the neutral axis should be the same, both above and below the neutral axis, in order to have no part of the section on one side subjected to a higher stress than on the other side. In other words, the center of gravity of the section should be in the center of the figure. This is fundamental. The proposed section departs so far from this principle that the metal in the head will be subjected to a stress 24 per cent. higher than in the flange, so that, although the rail has been made deeper, its efficiency as a beam has been actually reduced. To be sure, this will relieve the metal in the flange from some of its duty, but it will be at the expense of the metal in the head.

"If the metal in the flange is inferior to the metal in the head, then there is only one remedy, and that is to give the metal in the flange more work. This points to the utilization of a universal mill of the Grey type, such as is in operation in Differdingen, Germany, for rolling broad flange beams. Such a mill is now being built by the Bethlehem Steel Company for rolling beams in this country. The Bethlehem Steel Company considered the rolling of rails in such a mill, but felt that the development of the Grey mill for producing structural shapes was a sufficient burden to undertake, for the present at least. Thus the idea of rolling rails in a universal mill is not new, and has been proposed by Henry Grey, the inventor of the Grey mill.

"In considering the rolling of rails in a universal mill, the question will arise as to the possible tonnage capacity of such a mill as compared with the present three-high mill. This can be answered by making the horizontal rolls, and perhaps the vertical rolls as well, three-high in the proposed universal mill, so that the metal in the rail, in all of its parts, would receive exactly the same amount of work. A three-high universal mill for rolling thin skelp is now in operation at the National Tube Works, McKeesport, Pa."

No. 2 Furnace at Saxton, Pa., owned by Joseph E. Thropp, made a new record for production in June. The output was 5171 gross tons, which is quite a gain on the old high record of July, 1902, which was 4531 tons. The furnace was only blown in on May 1, and none of the new boilers or blowing engines is yet in service. The excellent work in June was done notwithstanding a number of unavoidable stops which possibly reduced the output more than 200 tons.

### Pennsylvania Rail Breakages Insignificant.

In the opinion of Chief Engineer A. C. Shand of the Pennsylvania Railroad, the agitation of the question of broken rails has apparently greatly magnified the extent of such breakages. He is quoted as follows:

"There has been a good deal said, not only in the scientific papers, but in the daily papers, in reference to broken rails being found in main tracks of the leading railroads of the country. As a matter of fact the number of rails which have actually been broken in the main line running tracks of the Pennsylvania Railroad is so insignificant as hardly to deserve mention. With the enormous traffic passing over the road, which has increased so much in the last few years, it is not surprising that a number of rails should fail.

"It might be interesting to analyze the reports which have been made on this subject. During the year 1901 there were removed from the main running tracks of the Pennsylvania Railroad east of Pittsburgh and Erie 675 defective rails. A very large portion of these, however, were not broken, but were rails that were not properly holding up under the traffic and were what is commonly known as 'mashing,' on account of the loads passing over them. This represents 46.6 rails removed from track on account of defects for every 1,000,000,000 tons of freight moved 1 mile. In the year 1905 there were removed 1747 defective rails, or 90 rails per 1,000,000,000 tons moved 1 mile. Not one-tenth of these rails were broken. During the year 1901 there was a total tonnage over the Pennsylvania Railroad east of Pittsburgh and Erie of 14,475,000,000 tons, and during 1905 there was a tonnage of 19,387,500,000 tons, an increase of 34 per cent., the passenger train mileage also increasing during the same period 29 per cent.

"It will, therefore, be seen that the Pennsylvania has little cause for complaint on account of defective rails; in fact, it is remarkable that such an enormous tonnage, with such a large portion of steel cars loaded to maximum of 110,000 lb., in addition to the weight of 40,000 lb. of the car itself, can be carried so safely and with such a small proportion of defective rails. It is true that the officials of the Pennsylvania have, like all other roads, done their best to insist on a better quality of rail, and will continue to do so, but that is more from a standpoint of getting the very best that can be secured for the money.

"It is also a fact that during the last 25 years there has hardly been a single accident to a passenger train which could be attributed to defective or broken rails on the Pennsylvania between New York and Pittsburgh. This would clearly indicate that the company is exercising a very close supervision over the maintenance of its various lines, and the traveling public may not feel in any way alarmed on account of exaggerated reports appearing from time to time regarding this important subject."

**The Promotion of Engineering Education.**—Trade schools are not as numerous in the United States as they should be, according to the opinion of the Society for the Promotion of Engineering Education. This society, at its annual meeting held in Cleveland last week, authorized the appointment of a committee to act in conjunction with four other societies to promote elementary technical education. The matter was left in the hands of the Governing Council and the committee will be named in the near future. The societies invited to join in the movement are the American Institute of Mining Engineers, American Society of Chemical Industry, American Society of Mechanical Engineers and American Society of Civil Engineers. Officers elected by the Society for the Promotion of Engineering Education were as follows: President, Charles S. Howe, president of Case School, Cleveland; first vice-president, Clarence A. Waldo, Purdue University; second vice-president, William G. Raymond, University of Iowa; secretary, Arthur L. Williston, Pratt Institute; treasurer, William O. Wiley, New York.

## Quinquennial Census of the Tin and Terne Plate Industry.

WASHINGTON, D. C., July 9, 1907.—The Census Bureau has completed its report upon the manufacture of tin and terne plate in the United States for the quinquennial census of 1905. The report, which has been prepared by Story B. Ladd, is entirely distinct from the comprehensive monograph on the iron and steel industry, a full abstract of which was published in *The Iron Age* last week, although the grand total of the products of that industry includes the value of the black plates used in the tin and terne plate mills. The period covered by this report is the calendar year 1904, or the business year of the establishments reporting, which most nearly conforms to that year. In the census of 1900 the period covered was from June 1, 1899, to May 31, 1900. The gross ton of 2240 lb. is used, except where otherwise stated.

### Growth of the Industry.

Prior to 1890 the production of tin and terne plate in the United States was of slight importance. Since that date the industry has grown rapidly, as is shown by the increase in production from about 2,236,000 lb. of tin and terne plates in 1891 to over 849,000,000 lb. in 1900 and to over 1,000,000,000 lb. in 1904. As the statistics relating to the manufacture of tin and terne plate as a separate industry were first collected at the census of 1900, comparisons can only be made between 1900 and 1904.

The manufacture of black plates and the subsequent dipping of the plates to coat them with tin or terne metal are, as a rule, accomplished in one and the same establishment, without, in many cases, any distinction being made between labor and expense chargeable to the manufacture of the black plates and that pertaining to the tin and terne dipping. The industry should be treated as an entirety, but for comparative purposes it is desirable to follow the plan of presentation employed at the Twelfth Census. Moreover, as the manufacture of black plates is a rolling mill operation, it is important that the statistics relating thereto be included in those for the industry classified as "steel works and rolling mills." Therefore separate reports were requested for the black plate manufacture and for the tin and terne dipping industry. Where these reports could not be made from book accounts, an apportionment of capital, labor and expense was accepted, the rolling mill report being credited with the black plate product at the market values and the tin and terne plate dipping report being charged with the same as material used.

### General Statistics.

The following table is a comparative summary of the general statistics of the active establishments engaged in the tin and terne dipping and black plate industries for the census years 1900 and 1904:

As a rule, black plate mills operated in conjunction with dipping establishments produce black plates only, and, with the exception of three cases, black plates constitute the chief product of the independent rolling mills making black plates.

The establishments which manufacture black plates and also coat them are counted both in the tin and terne dipping industry and in the black plate industry, but such establishments count but one in the number of establishments for the combined industries. There was 27 such establishments in 1904 and 35 in 1900. In other words, 75 per cent. of the active dipping establishments were equipped for the manufacture of black plates in 1904, as compared with 61.4 per cent. in 1900.

The capital invested in the black plate industry in 1904 constituted 66.4 per cent. of the total capital for the combined industries, as against 75.3 per cent. in 1900. The cost of materials used as well as the value of the products include a duplication, much of the black plate product of the black plate industry being consumed as material in the tin and terne dipping industry. Thus the cost of the black plates consumed by the dipping establishments was \$22,988,237 in 1904 and \$20,590,566 in 1900, which leaves \$26,021,949 as the approximate cost of materials used by the combined industries in 1904, as against \$24,414,150 in 1900. In like manner, deducting the same duplication from the value of products, the approximate value of the products in 1904 was \$42,690,880, as compared with \$41,322,053 in 1900. This shows an increase of 6.6 per cent. in the approximate net cost of materials and 3.3 per cent. in the approximate net value of products in 1904, as compared with 1900.

The following table shows the value of the net products of the tin and terne plate dipping and black plate establishments for 1900 and 1904:

Industry.	1904.	1900.
Tin and terne dipping.....	\$35,283,360	\$31,892,011
Black plate.....	7,407,520	9,430,042
Totals.....	\$42,690,880	\$41,322,053

The figures presented above do not include \$22,988,237 in 1904 and \$20,590,566 in 1900, the value of black plates consumed by the tin and terne dipping establishments. Duplication has been largely avoided by omitting the value of the domestic black plates consumed by the tin and terne plate dipping industry from the products of the black plate industry.

Some duplications remain, however, but they are of a minor character and the values of all products for each census year are substantially correct.

The products of the black plate industry remaining after the exclusion of the black plates consumed by tin and terne dipping establishments include the black plates otherwise used and all other products of the rolling mills making black plates. The slight increase in the value of net products of 3.3 per cent. is due to the considerable decrease in the value of the excess of the products of the

	1904.			1900.			Per cent. of increase.		
	Total.	Tin and terne dipping industry.	Black plate industry.	Total.	Tin and terne dipping industry.	Black plate industry.	Total.	Tin and terne dipping industry.	Black plate industry.
Number of establishments	*44	36	35	*66	57	44	33.3	†36.8	†20.5
Capital .....	\$32,457,487	\$10,891,239	\$21,566,248	\$27,488,302	\$6,790,047	\$20,698,255	18.1	60.4	4.2
Salaried officials, clerks, &c., number .....	861	284	577	726	333	393	18.6	†14.7	46.8
Salaries .....	\$936,682	\$309,554	\$627,128	\$818,015	\$291,323	\$526,692	14.5	6.3	19.1
Wage earners, average number .....	17,164	4,847	12,317	14,826	3,671	11,155	15.8	32.0	10.4
Total wages .....	\$10,559,723	\$2,383,070	\$8,176,653	\$10,288,061	\$1,889,917	\$8,398,144	2.6	26.1	†2.6
Men 16 yr. and over .....	16,379	4,212	12,167	13,798	3,014	10,784	18.7	39.7	12.8
Wages .....	\$10,338,370	\$2,193,062	\$8,145,308	\$9,996,839	\$1,711,475	\$8,285,364	3.4	28.1	†1.7
Women 16 yr. and over .....	608	579	29	688	625	63	†11.6	†7.4	†54.0
Wages .....	\$185,371	\$179,917	\$5,454	\$193,834	\$172,568	\$21,266	†4.4	4.3	†74.4
Children under 16 yr. .....	177	56	121	340	32	308	†47.9	75.0	†60.7
Wages .....	\$35,982	\$10,091	\$25,891	\$97,388	\$5,874	\$91,514	†63.1	71.8	†71.7
Miscellaneous expenses..	\$1,815,288	\$389,873	\$1,425,415	\$505,128	\$236,456	\$268,672	259.4	64.9	430.5
Cost of materials used..	\$49,016,487	\$31,375,714	\$17,640,773	\$45,004,716	\$26,728,150	\$18,276,566	8.9	17.4	†3.5
Value of products.....	\$65,679,117	\$35,283,360	\$30,395,757	\$61,912,619	\$31,892,011	\$30,020,608	6.1	10.6	1.2

\* Includes 27 establishments in 1904 and 35 in 1900 which manufactured black plates as well as tin and terne plates; 9 in 1904 and 22 in 1900 which manufactured tin and terne plates only; and 8 in 1904 and 9 in 1900 which manufactured black plates only.

† Decrease.

‡ Includes value of rented property—1904, \$473,000, and 1900, \$165,000.

§ Includes a duplication of \$22,988,237 in 1904 and \$20,590,566 in 1900, the value of black plates reported among the products of the black plate industry and used as material in the tin and terne dipping industry.



black plate establishments over and above the black plates consumed by tin and terne dipping establishments.

The proportional number of establishments in Pennsylvania decreased from 45.5 per cent. of the total in 1900 to 43.2 per cent. in 1904.

Following is a comparative summary of the materials used by the tin and terne dipping and black plate establishments for 1900 and 1904:

KIND.	Unit of measure.	1904.		1900.	
		Quantity.	Cost.	Quantity.	Cost.
Aggregate .....					
Iron ore.....	Tons		\$49,016,487		\$45,004,716
Pig iron, spiegeleisen and ferromanganese.....	Tons			1,035	6,916
Old iron or steel rails and other scrap iron or steel.....	Tons			16,514	253,920
Iron or steel ingots, blooms, billets, tin plate bars, sheet bars and slabs.....	Tons	11,630	148,776	34,422	592,222
Domestic black plates or sheets for tinning, total.....	Tons	662,887	15,440,072	648,807	13,911,080
Bessemer steel.....	Pounds	1,019,524,757	22,988,237	825,556,992	20,590,566
Acid open hearth steel.....	Pounds	911,663,989	20,734,710	(†)	(†)
Basic open hearth steel.....	Pounds	19,343,920	436,850	(†)	(†)
Iron.....	Pounds	87,567,481	1,789,855	(†)	(†)
Foreign black plates or sheets for tinning.....	Pounds	949,367	26,822	(†)	(†)
Pig tin.....	Pounds	83,900	3,769	2,358,607	78,282
Pig lead.....	Pounds	24,243,851	6,709,164	20,282,778	4,528,473
Palm oil.....	Pounds	8,201,253	366,558	6,871,480	398,617
Sulphuric acid and tinning flux, bran and pink meal.....	Pounds	6,628,526	376,310	5,511,645	282,227
Boxes and nails.....			180,011		187,318
Fuel, total.....			504,887		303,316
Anthracite coal.....	Tons		1,490,407		960,526
Bituminous coal.....	Tons	3,240	9,960		6,465
Coke.....	Tons	287,969	462,293	598,113	619,245
Charcoal.....	Short tons	858	2,397	2,962	4,628
Natural gas.....	Bushels	156,800	13,325	12,926	739
Oil.....			203,795		328,388
Fuel for power.....	Barrels	2,422	4,238	50	1,061
All other materials.....			704,399		(†)
			808,296		2,911,253

\* Includes a duplication equal to the cost of the domestic material in the tin and terne dipping industry.

† Decrease.

‡ Not reported separately.

The tin and lead contents of terne mixture, when purchased in 1904, were entered separately at current values in the census returns for that year, but at the census of 1900 terne mixture, when purchased, was in some cases reported as "pig tin" and in other cases as "pig lead." For this reason the quantities and values of tin and lead, as reported for 1900, are not strictly comparable with those for 1904, except when combined.

#### Increased Use of Domestic Plates.

The heavy increase in the quantity of domestic black plates used—an increase of 193,967,765 lb., or 23.5 per cent.—and the decrease in the quantity of foreign plates used—from 2,358,607 lb. to 83,900 lb.—are worthy of notice.

The average cost of the domestic black plates used by tin and terne plate establishments in 1904 was 2.25 cents per pound, as compared with 2.49 cents per pound in 1900; and the average value of the black plates turned out by the rolling mills in 1904 was 2.24 cents per pound, as compared with 2.38 cents per pound in 1900. The average value of the iron black plates made by rolling mills in 1904 was 1.96 cents per pound; of the Bessemer steel black plates, 2.31 cents per pound, and of the open hearth steel black plates, 2.17 cents per pound. In 1900 there were no iron black plates reported as manufactured and the Bessemer steel black plates were of an average value of 2.35 cents per pound and the open hearth steel black plates 2.63 cents per pound.

#### Production Importation and Consumption.

The following table shows for tin plates, terne plates, taggers tin, &c., the total domestic production and consumption, the imports, the exports of domestic and of foreign origin, and the percentage of the domestic consumption supplied by imported plates for the quinquennial periods from 1890 to 1905:

Year.	Production. Pounds.	Exports of domestic. Pounds.	Domestic retained for consumption. Pounds.	Imports. Pounds.	Exports of foreign. Pounds.	Total retained for consumption. Pounds.	Per cent. of im- ports to total consumption.
1905.....	1,032,940,706	22,990,816	1,009,949,890	161,066,820	180,550	1,170,836,160	13.7
1900.....	850,004,495	319,579	849,684,916	147,963,804	850,228	996,798,492	14.8
1895.....	193,800,320		193,800,320	508,638,938	468,249	701,371,009	72.4
1890.....	(†)			680,060,925	1,550,229	678,510,696	100.0

\* Bureau of Statistics, Department of Commerce and Labor, "Statistical Abstract of the United States," 1905.

† Production according to census returns.

‡ Not reported separately.

The tin plate industry was of very small proportions in the United States in 1890; very few tin and terne plates were made for sale, and the market was practically supplied by imports. The establishment of the industry dates from 1891, when the output was about 2,236,000 lb. The first export of domestic plates was made in 1898, the amount being 20,827 lb.; in 1900 the amount had increased to 319,579 lb., while in 1905 it was 22,990,816 lb..

a gain for the last five years of more than seventyfold. The net amount retained for consumption increased for the five-year period 1900 to 1905 174,037,668 lb., or 17.5 per cent., and the domestic production increased 182,936,211 lb., or 21.5 per cent.

#### Capacity and Equipment.

On the basis of 300 working days for the year the tin and terne plate product for 1904 was 76 per cent. of the capacity of all establishments on single turn; the output of tin plates being 77 per cent. of the annual capacity and the terne plate product, 70.5 per cent.

The majority of the active establishments operated in 1904 on double turn. There were eight establishments on single turn, which as a rule is 10 hours; 21 on double turn; seven on triple turn, eight hours to a crew, and five establishments were idle during the year. There were 23 establishments equipped for the manufacture of both tin and terne plates, 20 establishments for the manufacture of tin plates only, and six for the manufacture of terne plates only. Thus 43 plants had tin plate and 29 terne plate equipments. In 1900, of the 59 active and idle plants, 35 were equipped for the manufacture of both tin and terne plates, 15 for the manufacture of tin plates only, and nine terne plates only; or 50 for the manufacture of tin plates and 44 for the manufacture of terne plates.

W. L. C.

The Ridgely Trimmer Company, Springfield, Ohio, manufacturer of special riveting machines, has had an increase of 60 per cent. in its business during the past year, according to reports made at a recent meeting of the stockholders. The company has recently added some new machinery, and has enough orders on hand to run the plant the rest of the year.

# THE IRON AGE

1855-1907.

New York, Thursday, July 11, 1907.

Entered at the New York Post Office, as Second Class Mail Matter.

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						HARDWARE EDITOR.

## New Blast Furnace Capacity.

Ten absolutely new blast furnaces, with an annual capacity of 1,340,000 gross tons, were blown in during the first half of this year; at least 26 absolutely new furnaces, with a capacity of 3,900,000 tons, are being built. This makes a record of additions to blast furnace capacity which at no time in the past has been closely approached.

In some quarters there is invariably a disposition to belittle the prospects of increased production through the building of new furnaces. The argument is put forth, rather because it fits what is desired to be proved than because precedent shows its justice, that old furnaces are playing out, and that some new furnaces must be built merely to maintain the old pace. The presentation here given refers only to absolutely new furnaces; no account is taken of rebuilding and remodeling, the result of which is more than sufficient to maintain the old pace. For instance, the absolutely new furnaces blown in during 1905 and 1906 would have indicated an increase in total production from 1905 to 1906 of 1,250,000 tons; the actual increase between the two years was 2,315,000 tons. The outside increase was made through the remodeling and rebuilding of old furnaces and harder driving. In both these years all available furnace capacity was pushed as hard as it could be.

It is safe to say that any showing of absolutely new furnaces built or being built discloses less of an increase in production than will actually be made, provided the demand for pig iron is sufficient. If new furnaces are completed far behind schedule time, or work entirely suspended, the reason is that market conditions have become less favorable. Inasmuch as statistics of new furnaces being built are studied largely with a view of determining whether demand can equal productive capacity, such an outcome may constitute a verification of the conclusion, even though the prospective furnaces do not actually make pig iron.

The 10 new blast furnaces blown in during the first six months of this year comprise five steel works furnaces, with an annual capacity of 805,000 tons, and five merchant stacks, with a capacity of 535,000 tons. In the order of their blowing in these were as follows: Steel works furnaces—Haselton No. 3, Republic Iron & Steel Company; Lackawanna No. 7, Lackawanna Steel Company; Bethlehem E, Bethlehem Steel Company; Minnequa F, Colorado Fuel & Iron Company; Carrie No. 6, Carnegie Steel Company. Merchant furnaces—Toledo No. 2, Toledo Furnace Company; Josephine, Corrigan, McKinney & Co.; Federal No. 1, Federal Furnace Company; Perry, Perry Iron Company; Mayville, Northwestern Iron Company.

The blowing in of 10 new furnaces, with 1,340,000 tons annual capacity, is, as stated, entirely unprecedented. Following are the annual capacities of new furnaces blown in during the past five half-years:

	Tons.
First half, 1905.....	974,000
Second half, 1905.....	482,500
First half, 1906.....	825,000
Second half, 1906.....	430,000
First half, 1907.....	1,340,000

Prior to the first half of this year the largest half-year was the first half of 1905; but while nearly all the furnaces lately blown in were furnaces which had been but recently projected, several of those blown in during the first half of 1905 were old projects, work on which had been suspended or delayed by reason of the unfavorable conditions which developed in the latter part of 1903, which goes to make the present showing the more remarkable.

Still greater results are to be accomplished in the next 12 months if present work is pushed to completion, since, excluding all projects about which there is any possibility of doubt, there are being built at the present time no less than 26 absolutely new blast furnaces, with an annual capacity of 3,900,000 tons, distributed as to class as follows:

Furnaces Being Built.	Number.	Tons.
United States Steel Corporation.....	15	2,320,000
Independent steel companies.....	9	1,330,000
Merchant iron makers.....	2	250,000
Total .....	26	3,900,000

The Steel Corporation furnaces include Carrie No. 7 and McKeesport No. 4, certain to come in within two months; Duquesne Nos. 5 and 6, Ohio Nos. 5 and 6 and Lorain No. 5, all to be expected within a few months, and the eight at Gary, the first four of which will come in much sooner than the second four. A third group of four is contemplated, but no appropriation has yet been made for their erection. The outside steel interests include the four Aliquippa furnaces of the Jones & Laughlin Steel Company and one each of the Inland Steel Company, Youngstown Sheet & Tube Company, New York State Steel Company, International Harvester Company and Cambria Steel Company. The merchant interests included are Federal No. 2 at Chicago, and New River, near Hamilton, Ohio.

It is pretty safe to assert that if work is not interrupted, more than half, or about 2,000,000 tons, of the new capacity will be blown in during the second half of this year, while the great part of the balance should be blown in during the first half of next year. These estimates will certainly be found to err on the side of conservatism, provided no change occurs in general conditions.

If it is necessary for the new furnaces to make pig iron as soon as they can be completed, an estimate of probable pig iron production can easily be made. To show the swing of production the following figures must be cited:

Pig Iron Production.	Tons.
1902 .....	17,821,307
1903 .....	18,009,252
1904 .....	16,497,033
1905 .....	22,992,380
1906 .....	25,307,191
First half, 1905.....	11,163,175
Second half, 1905.....	11,829,205
First half, 1906.....	12,582,250
Second half, 1906.....	12,724,941

Production in the first half of the present year may be estimated at 13,500,000 tons. While furnaces do not customarily maintain as good a rate in the second as in the first half, there is an advantage of three days in the length of the second half. The new furnaces blown in during the first half had a capacity per half year of

670,000 tons, but on account of the time they blew in contributed only about 370,000 tons to the first half production. They will do 300,000 tons more in the second half, bringing the estimate to 13,900,000 tons. The 2,000,000 tons or so of new capacity to come in during the second half should contribute fully 500,000 tons, making a total estimate for the second half of 14,400,000 tons. This would give 28,000,000 tons for the calendar year 1907. Carrying the line farther, the furnaces completed by the end of this year could make a larger output, through full six months' operation, in the first half of next year, and allowing for additional new furnaces, the output in the first half of 1908 could readily exceed 15,000,000 tons.

It is not likely that these latter outputs will be reached, but they could be if the pressure for iron during the last two years and a half should be continued. The final blowing in of some furnaces may be delayed. It could hardly be expected, even though conditions were as uniformly favorable now as they were at the beginning of 1905, that when the utmost demand only called for a production of 23,000,000 tons in 1905, and this a gain of 5,000,000 tons over the best previous year, the demand three years later could mount 7,000,000 tons.

Nearly all these new furnaces are owned by companies with ample capital. It would be no disaster should necessity not force their rapid completion and blowing in. The cost of carrying a completed or partially completed blast furnace for a few months, or even a year, is very small compared with the earnings, once it becomes productive. The heavy demand for all products in 1902, leading to heavy imports, encouraged the building of a large number of blast furnaces. Before all were completed a depression came, and a number of furnaces completed in 1904 were not blown in for several months. In 1905 there was need for these furnaces, and in a few weeks they earned all the money it had cost to carry the investment over the inactive period. For a part of 1904 it looked as if the building of new furnaces had been overdone, but time has shown quite clearly that such was not the case. The best judges of the American iron trade have given up attempting to estimate its powers of expansion and recuperation. Some time the power of recuperation will be taxed, but a willingness to face that condition when it arises will be more profitable in the long run than a conservatism which would always avoid new erection.

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### More Stringent Boiler Inspection Needed.

When one stops to consider the consequences in loss of life and property that might ensue from the explosion of one or more of the great batteries of boilers installed in modern office and business blocks of our large cities, the question naturally arises, What measures are being taken to forestall the occurrence of such a disaster? Stringent laws, both State and municipal, prohibit the storage of gunpowder, dynamite, gasoline or other detonating substance in dangerous quantity in or near thickly populated centers; and, as a rule, these regulations are rigidly enforced. Such, indeed, is the wholesome fear inspired by the hazardous nature of high explosives, that there is little disposition to violate restrictive regulations governing their use. If the public mind were equally impressed with the potential explosive power latent in steam boilers there would doubtless be greater insistence upon the exercise of more vigilant supervision over the construction, maintenance and operation of such apparatus than is now had.

Occasionally a demonstration of this power, like that exhibited in a death dealing boiler explosion at Brockton,

Mass., a few years ago, stirs the entire country to a keener realization of the dangers threatened from this source. In response to the demands of public sentiment, aroused by this disaster, an immediate revision of the boiler inspection laws of that commonwealth was undertaken, and resulted in more comprehensive and effective measures for the prevention of casualties of like nature.

In almost every case boiler explosions are primarily due to a defect in the boiler itself. It may be in design, construction or material, or the defect may be one of development in use; but in any case it generally precedes failure. Secondary or immediate causes, such as unusual pressure or carelessness or mismanagement on the part of attendants, may, when the vessel is thus weakened by imperfections, precipitate an explosion at any time. In view of these facts too much emphasis cannot be laid upon the necessity of frequent and searching inspections, that will not only include the boilers while in operation, but will extend to an examination of material and the process of construction.

But few of the State and municipal laws regulating the inspection of boilers are adequate in their scope to guarantee the fullest possible degree of immunity from accident; laxity also in the enforcement of such as are provided still further weakens their effectiveness. It is unfortunate that, under our Statehood system of government, the application of federal inspection laws cannot be made to embrace all boilers used in inland commerce, as well as those of the steamboat and marine service, which alone are now subject to this supervision.

While there is admittedly much room for improvement in the present regulations governing the federal steamboat inspection service, they would, if so extended under the direction of the Bureau of Commerce and Labor, secure needed uniformity and more efficient service in the inspection of boilers than is now generally afforded under municipal and State authority.

Fortunately, owing to an increasing demand for higher pressures, the standards of construction have necessarily improved, and boilers better able to withstand the strains to which they are subjected are now being built. The introduction of water tube boilers has also, to some extent, lessened the danger of violent explosions. But, notwithstanding these safeguards, it should be borne in mind that with any vessel under steam pressure, the danger, though possibly modified, is not eliminated. On the other hand, the concentration of huge stores of steam energy in large boiler units and batteries heightens the possibilities of disaster in case of failure. It is therefore imperative in any case that, in the interests of public safety, such dangers shall be minimized. Stringent inspection requirements, under whatever authority conducted, are the chief means to this end.

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### Cost Freight Rates on Raw Materials.

President Mellen of the New York, New Haven & Hartford Railroad is quoted as advocating a policy of cost freight rates on raw materials to industries which need fostering in order that they may compete successfully with similar establishments more favorably located. As what is true of the New Haven system and the industries that feed it is equally true of other systems and their manufacturing establishments, the question involved is a broad one. Progressive railroad men agree that the railroad should adopt a paternal attitude toward those who make its system profitable. The greater the prosperity of cities and towns on a line of railroad the



greater the receipts of the company for freight and passenger service.

To achieve prosperity the manufacturer must be able to produce his goods at a price which will permit him to compete with other similar establishments, no matter where they may be located. If his raw materials cost him excessively he must curtail expenses in other departments of cost. If he pays low wages his class of help will probably be lowered in standard to that scale of wages. If he cheapens the excellence of his product he must lose standing in the market. Surely the railroad which hauls his freight should assist him in every reasonable way in its power. But we doubt the expediency of a railroad picking a manufacturing establishment here and another there and making a cost price for freight to them, while other lines of manufacture must pay full rates. Apart from the legality of preferred freight rates the temptation would be to make the prosperous manufacturer pay a little more in order that the less prosperous might be encouraged. Complaint is frequently heard from manufacturers that freight rates are too high. The railroad could do better to make the lowest possible price to all manufacturers, treating every one alike. The result would be not only to assist those who are already established, but to encourage others to locate on the line.

Inland places, away from water transportation of coal and other bulky commodities, are seriously handicapped by high rail rates, such as are imposed by certain companies. Rates are increased when times are prosperous, but they are seldom decreased below their level of normal good times. With business at a low ebb, freight rates are usually the same as when business is fairly good. The tendency, however, is to change this practice. The railroads with men of advanced ideas at their head are striving to follow out the theory that they must encourage those institutions of business which provide a livelihood for the people who make up the population upon which the railroad depends for its earnings. Passenger traffic increases with prosperity. The volume of freight grows correspondingly.

In many cases the practical adoption of such a policy is hindered by the necessity of earnings of sufficient amount to pay dividends on an overcapitalization, but even in these cases the general policy remains unchanged, the effort being made toward liberality to customers. Probably the statement will be classed as altruistic, but nevertheless it is based upon the often repeated argument of railroad men, who see in the policy the best manner of increasing net as well as gross earnings. It is a better theory than that of singling out the few struggling industries that need assistance because of unfavorable conditions of location. The view should be a broader one, including all manufacturing enterprises.

A leading wire manufacturer, using millions of pounds of copper each year, is quoted as making the following statement: The present deadlock existing between producers and users of copper is due almost entirely to the stringency of money conditions; the price of copper does not enter into the situation, and were conditions as they were a year ago consumers would buy the metal just as freely at 26 cents as at 20 cents. Our business has fallen off, so far as copper wire is concerned, approximately 30 per cent. from the volume of last year. This is due to the fact that electric light companies, power companies, street railroad concerns and other users of copper wire are finding it practically impossible to raise new money for their various needs, except at prohibitive rates, and as a result new business is coming in slowly.

## Customs Decisions.

### Gun Reappraisements.

A novel customs tangle has been straightened out by the Board of United States General Appraisers involving the validity of reappraisal. It seems that the Norvell-Shapleigh Hardware Company, St. Louis, imported certain guns, which were advanced in value upon entry by the appraiser at Philadelphia. The importers took an appeal from the action of the Custom House authorities, and a hearing was given at St. Louis at which the importer's side of the case was heard. Several months later, another general appraiser heard the Government's side at Philadelphia. It so happened that the general appraiser who heard the importer's case did not render a decision, and the general appraiser who did render a decision did not hear the importer's case. The decision was therefore made without the importers having been heard. The St. Louis house, in requesting the classification division of the Board of Appraisers to review the reappraisal, asked merely that the board remand the case to the status it occupied before a decision was made by the single general appraiser. In granting this request, the board says:

We are of opinion that there was no legal or valid reappraisal of the merchandise covered by this appeal, and that the importers are still in the position in which they were when they had submitted their evidence in support of the correctness of the entered value of the goods, just as if no decision of the case had been made by a general appraiser. We are of the opinion that the protest sufficiently and clearly sets out the proper claim. Where a complainant has been heard by one tribunal and the defendant by another, which then proceeds to decide the case, it can scarcely be said that the issues have been heard, and such a proceeding cannot fairly be called a trial. That was what happened in this case, and our chief concern is to determine how the importers may be put in a position to enjoy the right to a valid reappraisal such as is contemplated by the statute, and of which they have undoubtedly been deprived. That the importers are not divested of their right to a valid reappraisal by reason of the fact that reappraisal proceedings which turn out to have been invalid have been held is affirmed by Judge Lacombe in the opinion of the Circuit Court of Appeals, in the case of the United States vs. Curnen & Steiner.

General Appraiser De Vries, the third member of the classification tribunal, files a dissenting opinion. The Norvell-Shapleigh Company's protest will now go before a single general appraiser for adjudication.

### Metal Figures.

The Board of United States General Appraisers has reached the conclusion, after the taking of much testimony, that metal figures representing various kinds of animals are properly dutiable at 45 per cent. ad valorem under the provision in the tariff for articles of metal not specially provided for. The importations of metal articles of this character have been on the increase for some time, and it was accordingly decided to bring a test case. Importations entered by Samstag & Hilder Bros. and others of New York formed the basis for the suit. The importers maintained that the goods should be regarded as toys for purposes of duty with a tax of 35 per cent. In commenting on this contention, General Appraiser Fischer, who writes the decision for the board, says in part: "These metal figures . . . are known in trade as metal novelties, and serve generally a decorative purpose, as mantel, table, or cabinet ornament. Such articles are not intended nor designed for the amusement of children, and are not toys within the meaning of the tariff provision." The importers may appeal from the board's decision to the Federal Circuit Court.

Plans for the consolidation of the principal railroads of Mexico in one corporation controlled by the Government are gradually assuming a definite outline. So far as is now known, the roads to be included in the merger aggregate 6705 miles in length, but the capitalization of the new corporation, according to dispatches from Mexico, is planned upon so generous a scale that it seems to indicate an intention upon the part of the Government not only to extend and improve the railroads already practically purchased, but to acquire in addition all the other railroads in the country as rapidly as expiring concessions and other circumstances offer the opportunity.

## British Standard Specifications.

The Engineering Standards Committee of Great Britain has issued newly adopted specifications covering two classes of materials, as follows:

### Standard Specification for Rolled and Drawn Steel Bars for Automatic Machines.

The sub-committee was constituted as follows: Col. H. C. L. Holden, R.A., War Office (chairman); Henry Lea (Institution of Mechanical Engineers), A. Edmund Butler (Kirkstall Forge Company), O. P. Clements (Birmingham Small Arms Company, Limited), Herbert A. Dugard (Heaton & Dugard, Limited), Alfred Herbert (Alfred Herbert, Limited), Ernest Partridge (Steel Nut and Joseph Hampton, Limited), William Reavell (Reavell & Co., Limited), F. W. Wareing (William Robertson, Limited).

In a prefatory note the sub-committee dealing with this matter states that before laying down any standard sizes or margins of manufacture for steel bars for use in automatic machines, it was deemed advisable to ascertain the accuracy with which these bars were being produced in this country, and evidence was collected on this point by the issue of circulars to users and manufacturers of this class of material. It is upon the evidence thus obtained that the standard sizes and margins contained in the report have to a great extent been based. The mechanical tests and chemical analyses are also based on the evidence obtained, supplemented by the results of actual testing. Owing to the widely different results obtained when bars of small diameter are subjected to mechanical tests, the committee has not included any mechanical tests for steel bars under  $\frac{1}{2}$  in. in diameter.

The margin of manufacture for hot rolled round and square bars varies from + 0.010 in. for  $\frac{1}{4}$ -in. bars to + 0.025 for 2-in. bars. For bright rolled and drawn bars the margin varies from - 0.002 in. for  $\frac{1}{4}$  in. bars to - 0.004 in. for 2 in. bars. For hot rolled hexagon steel bars the margin is much the same as for hot rolled round bars, based on the size of bolt; that is, a hexagon bar for  $\frac{1}{4}$  in. bolt with a minimum width across the flats when left black of 0.505 in. has a margin of + 0.010, and a bright rolled or drawn hexagon bar of same size, but with a maximum width across the flats of 0.525 in., has a margin of - 0.002 in. The hot rolled hexagon bar for a 2 in. bolt has a margin of + 0.025 in.

The specification provides for good workmanship and bars that will take a good finish, and screw and turn easily. All sections other than round, square, and hexagon are special. The bars are divided into the following classes:

1. Bright, *a*, cold rolled; *b*, drawn.
2. Black, *c*, hot rolled; *d*, reeled (round sections only).

The tests for bars above  $\frac{1}{2}$  in. provided for two bars being selected out of each complete 100, with one test for each bar.

The standard test piece for rounds shall be employed whenever feasible. Where bars are above 1 in. in diameter and are tested full size as rolled, or have been turned down and the resulting test piece is above 1 in. in diameter, a gauge length of four times the diameter may be used if preferred by the manufacturer, in which case an increased elongation will be required. Should a test piece break outside the middle half of its gauge length, the maker may discard the test and make another from the same bar.

**First Quality.**—Tensile breaking strength, 28 tons per square inch; elongation, measured on eight times the diameter, not less than 14 per cent., or not less than 17 per cent. when measured on a gauge length of not less than four times the diameter (test piece F, Fig. 2).

**Second Quality.**—Tensile breaking strength, 35 tons per square inch, and elongations on eight times the diameter B 12 per cent., or 14.5 per cent. on four times the diameter.

One bar as rolled or drawn from every complete 100 bars as rolled or drawn is to be selected for the following bend test. Bend test pieces shall be taken from all steel bars from  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. diameter (or width across the flats) inclusive, and tested the full size as rolled or drawn. Above  $\frac{3}{4}$  in. diameter (or width across the flats) the test piece shall be turned down from the bars to a

diameter of  $\frac{3}{4}$  in. The test piece shall withstand, without fracture, being doubled over until the internal radius is equal to the diameter (or width across the flats) of the test piece, and the sides are parallel.

The steel from which the bars are manufactured shall be of the best quality, and upon analysis shall show that, in chemical composition, it conforms to the following limits:

**First Quality.**—Carbon not over 0.25, manganese not over 0.85, silicon not over 0.20, phosphorus not over 0.06, sulphur not over 0.06 per cent.

**Second Quality.**—Carbon not over 0.40, manganese not over 1.00, sulphur not over 0.20, phosphorus not over 0.06, sulphur not over 0.06 per cent.

Where steel is not produced at the works at which the bars are rolled or drawn, a representative of the purchaser shall be deputed to witness the tests of the material.

### Standard Specification for Ingot Steel Forgings for Marine Purposes.

The Sub-Committee on Steel Castings and Forgings for Marine Work, which has dealt with this matter, was constituted as follows: H. Withy (chairman) R. J. Butler, C.B., and W. E. Smith, C.B. (representing the Admiralty), Peter Samson (Board of Trade), H. J. Cornish and J. T. Milton (representing Lloyd's Register), J. Foster King (British Corporation for the Survey and Registry of Shipping), John Gravelle (Bureau Veritas), Bernard A. Firth (Steel Forging Makers' Association and English and Scottish Steel Founders' Association), A. D. Wedgwood (English and Scottish Forgemasters' Association), Thomas Putnam, J. W. Spencer and John Watson.

The main provision of the specifications allows either basic or acid open hearth steel. Not more than the lower two-thirds of the ingot is to be utilized, however, and the sectional area of the forging (as forged) is not to exceed one-fifth of the original ingot, and no part of the forging is to have more than two-thirds of the sectional area of the ingot.

All forgings are to be suitably and uniformly annealed, and in the case of a forging subsequently heated for further forging, it is to be again similarly annealed if required by the inspector. Patching or electric welding of defects is not permitted.

The test pieces are of the standard dimensions of the Engineering Standards Committee and are to be cut lengthwise from a part of not less sectional dimensions than the body of the forgings. They are to be machined and not forged down, and must not be detached until after annealing. The tests prescribed are as under:

The tensile strength of ingot steel forgings for marine purposes, ascertained from standard test pieces, must be between the extreme limits of 28 and 40 tons per square inch. In all cases a margin of 4 tons per square inch shall be allowed between the specified maximum and minimum tensile breaking strengths. The elongation, measured on a standard test piece, must be not less than 29 per cent. for 28-ton steel and 17 per cent. for 40-ton steel, and in no case must the sum of the tensile breaking strength and corresponding elongation be less than 57. The number of tensile tests from each forging shall be as may be specified, but at least one tensile test shall be taken from each forging. Where a number of articles are cut from one forging, one tensile test from this whole forging will be sufficient, unless more are specified.

Cold bend tests shall be made upon test pieces having a rectangular section of 1 in. wide by  $\frac{3}{4}$  in. thick. The test pieces shall be machined and the edges rounded to a radius of 1-16 in. The test pieces shall be bent over the thinner section. Bend tests may be made by pressure or by blows.

The test pieces must withstand, without fracture, being bent through an angle of 180 degrees, the internal radius of the bend being not greater than that specified below:

	Internal radius of test piece after bending.
	Inch.
Maximum specified tensile strength of forging.	
32 tons per square inch.....	$\frac{1}{4}$
Above 32 and up to 36 tons per square inch.....	$\frac{3}{8}$
Above 36 and up to 40 tons per square inch.....	$\frac{1}{2}$

One bend test is required from each forging, but more may be specified. If a test fail, the maker can demand a duplicate test by which acceptance must be determined.

## The International Steam Pump Company's Report.

Although the amount of orders booked by it during the year was the largest in its history, the net profits of the International Steam Pump Company for its fiscal year ended March 31, 1907, were only \$72,269 in excess of those of the previous year and less than those even for the years 1904 or 1903. Because of the fact that during the year the company's common stock was increased by \$5,500,000, and the preferred stock by \$2,500,000, the earnings for the total common stock were equal only to 3.75 per cent., as compared with 6.09 per cent. earned the year previous on the basis of the amount of stock then outstanding. Below is shown for six years the company's profits and the amounts and percentages earned on the common stock on the basis of the amount of stock outstanding:

	Net profits.	Surplus after charges.	Pfd. dividends.	Earned on—Common	
				amt.	per cent.
1907..	\$1,922,013	\$1,527,124	\$859,800	\$667,324	3.75
1906..	1,849,744	1,457,595	709,800	747,795	6.09
1905..	1,332,933	998,434	709,800	288,634	1.58
1904..	1,936,739	1,302,105	709,800	592,305	3.20
1903..	2,113,365	1,772,517	775,725	996,792	5.39
1902..	1,795,152	1,510,486	776,050	734,436	3.98

The company's capitalization for three years and its profit and loss surplus at the close of each are shown in the following table:

	1907.	1906.	1905.
Common stock .....	\$17,787,300	\$12,287,300	\$12,287,300
Preferred stock .....	13,835,000	11,335,000	11,335,000
Bonds and debentures...	4,792,185	4,879,000	3,960,965
Total capitalization .....	36,414,485	28,501,300	27,583,265
P. & L. surplus .....	2,551,707	2,029,186	2,252,031

A more favorable feature of this report is the better showing of working capital. Because of a lack of it the company's progress in the past has been considerably retarded. Consequently a gain of \$1,497,491 during the year can be regarded in a favorable light.

### Treasurer's Report.

The treasurer's report states that the figures given cover the operations of the following four associated companies: International Steam Pump Company, Henry R. Worthington, Blake & Knowles Steam Pump Works and Holly Mfg. Company.

The permanent assets show a net addition during the year of \$6,623,243.59. The bulk of this addition arises from the acquisition of the capital stock of the Power & Mining Machinery Company and from various minor items. The capital liabilities have been increased by \$8,000,000, which is the amount of new capital that was issued in acquiring the capital stock of the Power & Mining Machinery Company. The cash which the Power & Mining Machinery Company had on hand, \$1,650,000, was paid over to the International Steam Pump Company in accordance with the agreement of sale, and this amount appears as an addition to the current assets. From the valuation of the Lockport plant of the Holly Mfg. Company, which appeared in previous statements, there has been written off \$74,803.78, in order to bring the valuation down to \$150,000, at which price an option has been given to the present tenants of the property for its purchase. The current assets and liabilities are as follows:

Inventories of materials, supplies, finished work and work in progress (less reserve for completion of contracts) .....	\$5,787,737.51
Accounts and bills receivable, less reserve for bad debts .....	4,584,223.93
Cash .....	621,727.19
Total .....	\$10,993,688.63
Less current liabilities .....	3,482,881.33

Balance .....

This balance is \$1,897,836.11 in excess of last year.

Following is the surplus account:

The balance of undivided profits accumulated during the period of the existence of the International Company, as shown in the seventh annual report, was.....\$2,024,113.30

This has been reduced by the amount written off the valuation of the Lockport plant, as above stated of..... \$74,803.78

Less balance of Holly Mfg. Company surplus accumulated prior to its absorption by the International Steam Pump Company.... 5,073.04

\$69,730.74

And by adjustments on the Blake account of ..... 70,000.00

139,730.74

Balance of previous surplus..... \$1,884,382.56

Add net profits from combined operations of the associated companies during the year 1906-07, subject to charges on account of funded debt..... \$1,922,013.30

Less charges on account of funded debt:

Interest on International Company debentures.....\$210,000.00

Blake bond interest 36,833.32

Holly bond interest 35,000.00

Discount on bonds and debentures.... 12,398.75

Reserve on account of sinking fund—

Blake bonds..... 100,656.90

\$394,888.97

Dividends on preferred stocks:

Of International Steam Pump Company .....\$681,000.00

Of Henry R. Worthington ..... 140,000.00

Of Blake & Knowles Steam Pump Works ..... 38,800.00

### Assets.

Real estate, buildings, machinery, patents, patterns and drawings, good-will and investments in stocks and bonds of associated and other companies, &c. ....	\$32,748,010.17
Discount on debentures and bonds.....	150,105.88
Inventories of manufactured material, supplies, &c., on hand.....	5,829,341.37
Sundry debtors:	
Trade accounts and bills receivable, less reserve for bad debts.....	4,322,637.55
Miscellaneous .....	95,151.34
Balances in suspense.....	256,435.04
Associated company balances, in transit, &c.....	67,171.13
Cash in banks and on hand.....	621,727.19
Total .....	\$44,000,579.67

### Liabilities.

Capital stock and bonds authorized, less in treasury, &c.:	
Common stocks .....	\$17,787,300.00
Preferred stocks .....	13,835,000.00
Bonds and debentures.....	4,792,185.00
Total .....	\$36,414,485.00
Surplus capital (Blake).....	\$1,116,399.21
Reserve arising through operation of sinking fund .....	326,332.25
Sundry creditors:	
1. Notes payable.....	2,566,452.54
2. Trade accounts.....	568,447.59
3. Miscellaneous, including accrued interest on bonds and debentures.....	177,535.70
4. Shareholders for unpaid dividends.....	170,445.50
Reserve for completion of contracts.....	108,774.99
Surplus accounts .....	2,551,706.89
Total .....	\$44,000,579.67

### President's Report.

From the accompanying report of President John W. Dunn the following extracts are taken:

"The orders booked for the year just closed amount to \$13,500,000 and the orders on hand March 31, 1907, were \$6,500,000, which is far in excess of any other year in the history of the company. All of our companies show a substantial increase in orders taken, and there is a steadily growing demand for the products of our various companies, such as water works engines, air



compressors, condensers, water meters, centrifugal pumps, &c., and the orders for our standard duplex pumps show satisfactory gains from year to year.

"There has been an especially large increase in orders for gas engines manufactured by the Snow Steam Pump Works at Buffalo, this company having now under contract gas engines aggregating over 70,000 hp. Very satisfactory progress has been made in the development of this line of machinery, and we have now in operation more horsepower of gas engines over 1000 hp. each than any other builder in the country. Engines aggregating over 50,000 hp. have already been turned out, and the reputation of these engines is the highest. There are now in successful operation two 4000-hp. gas engine gas compressors in West Virginia, and three 5000-hp. gas engines in California, driving electric generators. Each of these five engines is larger than any other gas engine in this country or in Europe.

"The amount spent for improvements and additions during the past year represents such new machine tools and improved equipments as were necessary to keep up the efficiency of our various factories. There has been deducted from our profits \$396,311.32 to cover depreciation on buildings, machinery, tools, patterns, drawings, fixtures, &c.

"The Worthington Pump Company, Limited, of London, reports the best year since the organization of that company. The sales were largely increased and the results of the year's operations were very gratifying. Our foreign house reports a decided improvement in business conditions, with prospects for another good year.

"During the year just closed the arrangements to acquire the outstanding capital stock of the Power & Mining Machinery Company, Cudahy, Wis., mentioned in the last annual report, were consummated. This company was taken over as of May 1, 1906, and as indicated in the treasurer's report, there has been taken into this year's profits the guaranteed amount on this investment.

"Notwithstanding the increase in the price of labor and the large advance in the cost of raw material, the operations of the year just closed show very satisfactory returns. The work of concentrating our product in the shops equipped for special lines has been vigorously prosecuted, thereby increasing the amount and economy of the production. Our sales department is well organized and our companies are efficiently represented, not only throughout the United States, but in the foreign countries as well. With a large amount of orders on our books, taken on estimates based on advanced prices of labor and material, and with the factories equipped to turn out a large production at a minimum cost, and with the increasing demand for our products, we have every reason to look forward to the coming year in confident anticipation of increased profits over the past."

Records were broken in June at the plant of the Atlanta Steel Company, Atlanta, Ga. The two 35-ton open hearth furnaces, one of which was down for six days in the month, produced 4292 gross tons of ingots in the 25 working days of the month. In the past two months the rod mill made a new record for daily production three times, and a new high mark was made in the blooming mill and the hoop mill, the latter breaking the weekly record and the monthly record by about 20 per cent. in June. The blooming mill made almost as much steel in June on single turn as in the preceding month on double turn. J. A. Durfee is general manager of the company and Arthur W. Taylor is superintendent of the open hearth department.

At a meeting of the stockholders of the Duplex Metals Company, New York, manufacturer of Monnot metals, held last week, the capital stock was increased from \$3,000,000 to \$3,500,000, the increase being all preferred stock. The stock was increased to provide for expansion of the business.

For the first time in the history of Illinois a freight classification has been agreed upon by the Railroad Commission, railroads and shippers.

### The Bridgeport Furnace Project.

For a number of years the question of a blast furnace plant to be located at Bridgeport, Conn., has been discussed with all the points which characterize a tide-water location—coking in by-product ovens, &c. The matter has now taken shape through the formation of a company, to be named the Connecticut Iron, Steel & Coke Company, which is seeking a charter. References to this undertaking in the public prints have connected the American Tube & Stamping Company of Bridgeport and the president and treasurer of that company, Frank A. Wilmot, with the project. We are advised that they are not interested in it, except as consumers, and are not backing the enterprise financially.

The incorporators are Percy S. Bryant, Theodore C. Case, Frederick H. Allen and Constant L. Tuttle, but it is stated that besides these Hartford men are included a number of people already in the coal and iron business, and who are operating blast furnaces and selling pig iron, coal and coke. In an interview Mr. Wilmot states that those who have considered Bridgeport Harbor as a location have met two obstacles, saying:

"First, the channels of Bridgeport Harbor are not deep enough for the purpose; second, that there is no suitable site of sufficient area near deep water channels and with rail connections for such furnaces turning out a sufficient quantity of material to supply anything like the local and immediately adjacent trade and affording room to dispose of the quantity of refuse material or slag made in the manufacture of pig iron.

"It has even been said that within five years from the completion of such a layout the production of about 800 cu. yd. or tons of such waste material per day would permit of running a bulkhead of an average depth of some 12 to 15 ft. by some 20 yd. in width, a distance of between 3 and 4 miles in length.

"Such a company, if it were to locate in Bridgeport at all, requires a place to dispose of its slag with a minimum of expense, for oftentimes the pig iron business is done on a market margin of \$1 per ton or less.

"To reduce the costs further the company contemplates using either narrow or standard gauge track, with locomotives and end dump cars, with which to convey this waste material from its furnaces and disposing of it in building, as permitted by its charter, of a bulkhead sufficiently within the harbor lines already established by the Government around the generally unimproved harbor frontage from the east side of Bridgeport's inner harbor, easterly to Bruce's Brook at the head of Johnson's creek of channel to permit of docks being built by the owners of the present mud flats, from the shore line or high water mark, out to the dock lines, and the company does not contemplate exercising any rights under its privileges, so far as condemnation is concerned, except where necessary in order to continue in one uninterrupted line the general plan of harbor improvement contemplated by these broad gauge people, when they undertook to work out a scheme by which they could in disposing of their refuse material benefit to a greater or less degree every property owner of shore frontage along the entire distance considered in the charter.

"The United States Government engineer for this district has prohibited the dumping of refuse along the shore line north of the Yellow Mill bridge and also the Stratford avenue bridge because of the tendency for such fill to carry a constantly increasing size of wave of mud out into the channel as the fill extended toward the dock line.

"Now this new company expects, I understand, if granted such a charter, to build at its own expense such extensive bulkheads, and of a character which will outlast any wooden or timber bulkheads more than 100 to 1, and further to reimburse or pay the property owner in conjunction with its rights under the charter for any damage which the commission, appointed by the Superior Court, may award such property owner, but this new company under its charter has no such power as is provided in this city's charter for levying benefits on the abutting property owners, as in street improvement and bridge approach questions."

## Foundry Design.\*

BY F. A. COLEMAN, CLEVELAND, OHIO.

A foundry is a machine composed of a number of parts, each part having a certain duty which should be performed in harmony with the other parts. This machine should be housed in buildings erected to suit the machine. Raw materials are received or fed into the machine at certain places and the output is finished castings. We think this statement covers the foundry proposition; if it does, we are led to believe some peculiar methods are employed by many foundrymen. A foundryman desiring to buy an engine does not go to the engine builder and ask for an engine large enough to fill a building 30 x 40 ft.; but he tells him he wants a certain power and type of machine. Nevertheless many foundries start with the size of the building and work backward to the machine they desire to house.

One expecting to enter the foundry business may have a certain fixed sum of money to invest and desires to produce the best results from this investment; or a certain limited piece of property is to be used and it is necessary to produce the greatest output from the area; or it is desired to produce a certain tonnage of castings. Ordinarily any one of the above three conditions will explain the beginning of a new foundry; and a careful study will show that in no one of them should the building be allowed to become the determining factor in the design of the machine. The writer claims that the buildings are drawbacks to the foundry; they keep out light, complicate the ventilation, and are in the way generally.

### Three Types of Problem in Design.

It seems as if there are but three problems to be solved in designing a foundry, which may be stated as follows:

1. Given a certain sum of money, to produce the largest and most efficient foundry.
2. Given a certain area of land, to produce the greatest output efficiently at the least expense.
3. Given a certain desired output, to produce the highest efficiency at the least expense.

It may be of interest to see how many different lines of foundry work are carried on. A classification according to metals follows:

1. Iron foundries, producing gray and malleable iron castings.
2. Steel foundries, producing acid, basic and crucible steel.
3. Brass foundries, producing all kinds of alloy castings, of which we may assume copper as the base.
4. Aluminum foundries, almost universally a part of brass foundries and producing alloys containing high percentages of aluminum.

Classifying according to methods of melting and avoiding the unusual or experimental methods, we have:

1. *Iron*—Cupola furnaces, air furnaces.
2. *Steel*—Open hearth, converter, crucible.
3. *Brass*—Crucible, direct melting.
4. *Aluminum*—Crucibles, direct melting.

Classifying as to fuels we have:

1. *Iron*—(a) In the cupola furnace: Coke, coal, charcoal.
- (b) In the air furnace: Coal, gas.
2. *Steel*—(a) In the open hearth: Gas, oil. (b) Iron melted in the cupola for the converter, with cold blast. (c) In the crucible furnace: Soft coal, oil, gas.
3. *Brass*—(a) In the crucible furnace: Coke, hard coal, soft coal, oil, gas. (b) In direct melting furnace: Oil, gas.
4. *Aluminum*—(a) In the crucible furnace: Oil, gas, coke.
- (b) Direct melting: Coal, oil, gas.

Classifying according to character of work:

1. *Iron*—Jobbing, light work; jobbing, heavy work; architectural, hardware, stove plate, soil pipe, water and gas pipe, car wheel, pipe fittings, machinery, electrical.
2. *Steel*—Jobbing, electrical, machinery, marine, railroad.
3. *Brass*—Jobbing, ornamental and art, lighting fixtures, architectural, hardware, plumbers' and sanitary supplies, steam and hydraulic, marine, bell, automobile.
4. *Aluminum*—Jobbing, automobile.

These classifications are not supposed to be complete or exact, but on examining them it will be readily seen

that many of these points enter into the foundry design. The foundryman should therefore settle a number of them before considering going ahead with a foundry proposition.

### Threefold Operations.

The foundryman should determine as closely as possible the class of work he expects to make and the process he expects to use in making it. If the class of work to be made is definitely known, the problem is simplified. Too much importance cannot be laid upon this fact, because the foundry can then be designed to meet known conditions. It makes no difference what a foundry may make, three general operations are involved:

A. *Melting*.—All materials, processes, equipment and labor necessary to produce molten metal in the molds are included under this head.

B. *Molding*.—All materials, processes, equipment and labor necessary to produce a form of mold for receiving the melted metal come under this head; as cores are a part of the mold, core making is included.

C. *Cleaning*.—All materials, processes, equipment and labor necessary to remove adhering molding metal and excess metal not a part of the actual pattern come under this head.

According to this arrangement the melting cost would be the cost of the metal in the mold; the molding cost would be the cost of the molds and cores ready for the metal; the cleaning cost would include the removal of the rough castings from the mold, making it like the actual pattern and delivering to the shipping room. A number of overhead expenses would, of course, be chargeable to these three operations.

### Relation of Work to Space and Output.

We may assume the case of a foundryman who desires to make automobile and marine engine cylinders. He either knows from his experience or finds on investigation that he can produce the best castings with the air furnace. This determines his method of melting. He next finds that he can depend or will have to depend upon the business of certain customers, and that it will be to his advantage to make the work upon some style of molding machine. If he builds his foundry upon this last assumption, and finds the business comes as he expected, then he will get a certain output. If he has been wrong in his assumption and he has to resort to bench or floor molding, then his output per molder will be reduced. The first assumption would require a certain melting capacity per molder, while the last would require a smaller melting capacity per molder.

Many points are involved in the output of a foundry, but it may be roughly stated that the output divided by the area will be constant for the same line of work. There are exceptions to this statement, of course. In a brass shop making sanitary work in iron flasks, the molds if poured flat may be stacked three and four high; if poured on end they cannot be stacked and the output of a molder will require a much larger area.

The endeavor is being made to show that many things are peculiar to each metal and to each method, and therefore all these points should be taken up and settled as a part of the preliminary work. It is admitted that at times no one can determine what should be done, but it is to the foundrymen's interest to reduce the elements of the unknown and the uncertain as much as they can.

### Foundry Layout.

It can now be assumed that the foundryman has definitely decided to make a certain line of work in a certain way, and is ready to design a foundry machine which will give him the greatest output of good castings for the least cost. He should have a map of the property showing streets, alleys, railroads, &c. If the property is or may be affected by buildings adjoining, these should be noted. If the area is large and the surface is irregular it may be necessary to make a topographical survey of the tract, but it can be set down as a fact that a careful study of the property itself will show that certain advantages may be gained by designing the foundry with reference to these property conditions.

A building 70 x 100 ft. may be designed and do very well on a 10 acre lot, but will be a failure on a lot 70 x

\* From a paper read at the Philadelphia convention of the American Foundrymen's Association, May 22, 1907.



100 ft., surrounded by high buildings in the city.

The amount of metal to be melted to produce the tonnage of finished castings, and the number of molders necessary to handle the metal are next determined. From this we find the area required for the furnaces, molders, coremakers, core ovens and cleaning. The areas and capacities of the storages for metals and fuels are found. The storage of the flasks, molding and core sands, &c., may be determined. Furnaces, molders', coremakers' and cleaners' supplies should have a place and require areas which should be determined. Then there are to be considered pattern and machine shops; pattern storage, locker and wash rooms; closets and urinals; sand preparation rooms, shipping room and room for holding castings to see if orders are completed; foundry foreman's office; main office; power plant and laboratory.

#### Space Requirements.

The determination of the area required for each operation and such other information as is peculiar to each foundry, places the foundryman in position to start the actual layout of the foundry. The problem now is to make an arrangement of these various areas which will permit of the movement of the materials through the various processes of melting, molding and cleaning, and deliver the finished castings to the shipping room with the smallest amount of labor, the minimum amount of equipment, and the lowest cost.

The storages for all materials received should be close to a central unloading point where they are to be used. The first statement is particularly true of foundries served by sidings. Fuel and metal should be very accessible to the furnaces. Sands should be convenient to the coreroom and the molding floors. They may be passed through the sand preparation rooms and then be distributed to the coreroom and the various molding floors. Likewise the core ovens should be close to the fuel, and the core room located so as to serve the foundry without unnecessary handling of cores.

#### The Handling Equipment.

In foundries served by cranes, the ovens should be arranged so that the cores may be handled from the cars by the main bay cranes into place. This does not mean that the main cranes should be used to load cars; this may be done by core bay cranes. It is not profitable to bake large and small cores in the same oven. The best results are obtained, both in baking and in fuel saving, by baking bench cores in small ovens and floor cores in large ovens. If possible the small core racks should be placed on the division line between the core room and the foundry and accessible to both.

In the foundries where the charges are hoisted, the charging floor should be large enough to carry at least one day's supply to avoid shutdowns. In heavy shops running two or more cupolas side by side, they should be spaced so that two cranes may serve at the same time. Pits should not be located in front of the cupolas.

Provisions should be made for the handling of the ladles at the cupolas by small cranes so as not to tie up the main bay cranes.

It is best to pull the heavy core cars by haulages independent of the cranes. The heavy cranes should not be called upon to do work which can be better done by lighter and cheaper equipment.

In small or light shops, floors should be planned to give each molder a certain area which can be served very readily with metal either by trolley system or some other method which will take the metal quickly and without confusion to each area.

All areas should be regular in form and not cut up. Posts on columns should be avoided and should be kept off the molding floors or placed at division lines between bays or floors. Crane loads and roof loads should be carried directly through columns to the foundations; there is no reason for requiring the actual walls to carry loads.

#### Light and Ventilation.

Taking up the form of construction best adapted to foundry purposes, it would seem that of two types the one which will give the greatest amount of light and the best ventilation is the one to adopt.

Every foundry requires all the light it can get and ideal results are obtained when there is nothing but glass from the sills to the eaves and a continuous line of glass from end to end. The lanterns or monitors should be wide and high; a narrow monitor is about as expensive as a wide one and not as effective.

The general form of construction as above recommended is so simple and good that it does not seem necessary to mention it, and yet the majority of foundries are much more costly and do not produce as good results.

In addition, whitewash or cold water white paint are worth many times the cost. If the foundries will wash the windows but once a year they should do it in October and not in the spring. Many a foundry can declare a dividend with the money wasted on lighting, when nature stands ready to do it for nothing if only given the chance.

Do not, under any consideration, build any kind of a foundry to do any kind of work with less than 14 ft. outside walls. A single bay foundry 50 ft. wide should be not less than 16 ft. high on the sides.

When floors are to be paved in the foundries, good concrete will give first-class results.

#### Power.

Foundry power is a question which interests many. Shops requiring a small amount of power in the cities can often buy power from the electric companies to good advantage. This is particularly true when there is a large fluctuation in the quantity used.

The number of producer gas engines will increase in foundries, as there are many points in their favor. Probably the majority of foundries use less than 100 hp. The building of successful bituminous coal gas producers in units as small as 125 hp. and the present reliability of gas engines are strong factors in making this increase.

#### Lockers and Wash Rooms.

The modern foundries consider locker and wash rooms as necessary. They should be used for washing and dressing rooms only, and should be in charge of some one at the time the men are going to and leaving work. The closets and urinals should be located so that it is not necessary for the men to leave their floors; the saving in lost or loafing time is worth the additional cost.

#### Auxiliary Departments.

In foundries running a large number of pieces of the same pattern, a casting cleaning room has many points in its favor; castings are turned into this room from the foundry; they are counted and inspected and any shortage must be supplied by the foundry; this avoids congesting the shipping room with incomplete orders. In shops having factories, this room really becomes a storehouse where requisitions from the factory are filled.

In the larger plants a room for the holding of patterns on their way to the foundry is a convenience. Patterns are thoroughly overhauled to know that they are in condition, with all parts, core boxes, &c., accounted for.

The foundry foreman's office should be located convenient to the foundry to give a good view of the plant; in larger shops requiring a number of subforemen, this is not so important.

The distribution of power throughout the plant by motors does away with the necessity of making the location of the power plant a factor in the design of the foundry. The pattern shops, flaskmakers' shop and machine shop are not an actual part of the foundry, and the foundry layout should not take these into serious consideration. The actual foundry provides for melting, molding and cleaning; everything else which may be necessary is subsidiary and should give way.

The writer desires, however, to qualify the above statements with reference to foundry plants which are designed to occupy the entire area of the property, and where the greatest output must be secured from this area. Under such conditions everything must be considered as a part of the whole and it becomes somewhat a case of give and take between the various departments.

The East with its older foundries and closely settled localities has been, in many lines of work, forced or led into the construction of foundry plants of two or more stories. The West is beginning to do the same thing under the same stress of conditions; the melting, molding



and generally the core making are carried on on the top floor; cleaning, sorting and shipping and other operations being done on the lower floors; such foundries are generally engaged in light work only.

#### Building Materials.

Of the materials of construction it may be said that brick is mostly used, with wood or steel framing. Fire-proof construction is increasing. The foundry with its furnaces, ovens, hot metal and careless employees is peculiarly subject to fires. That this is recognized by nearly all foundries is shown by the construction of the fire-proof pattern storages.

Oftentimes the destruction of the plant itself during the rush season is fully as serious as the loss of the patterns. This is true of jobbing foundries, where customers generally insist upon the delivery of their castings, fire or no fire.

#### In General.

The great need for designing plants not only for the present but for the future is shown by the large number of foundries which have a main foundry and a vast litter of dog houses. Many foundries are not thoroughly christened until they add such a dog house. But they are expensive; they break up the routine, require extra foremen and generally rob the main foundry of its share of light.

The writer believes that the foundryman should thoroughly study his plans on paper. Each problem has an answer which can be more cheaply worked out on paper than on the ground. It should be remembered that profit is the ultimate end—profit produced by making good castings at a low cost.

The fixed charges should be kept down. Bad design resulting in the expensive handling of materials means useless fixed charges, limited output and of course too high a cost.

Many an expensive investment in equipment or make-shifts could have been avoided by the proper designing of the original plant. Many foundrymen now keenly realize that what appeared like a saving in construction has resulted in a heavy cost for operation.

### The Northwestern Malleable Iron Company's Quarter Centennial.

In commemoration of its twenty-fifth anniversary, the Northwestern Malleable Iron Company, Milwaukee, Wis., has issued an attractive booklet containing a sketch of its history. The firm was established June 27, 1882, as Elmore, Sivyver & Co., by Eltinge Elmore, Frederick W. Sivyver and William A. Draves. At the outset one small cupola and an annealing oven constituted the equipment of the shop. There were then 25 employees. Mr. Elmore shortly sold his interest to Helmus M. Wells. In 1883 the cupola was replaced by a small reverberatory furnace, and in the same year the firm name was changed to the present one, but it was not incorporated until five years later. After a decade of existence the annual sales had increased sixfold, the capacity expanded from 600 to 5000 tons annually, and the number of employees reached 600. The present annual capacity is 30,000 tons; there are now 11 reverberatory furnaces, a 10-ton cupola and 15 annealing ovens; the foundries aggregate 140,000 sq. ft. of floor space, and the present working force numbers 1200. The company was one of the first to build and equip a chemical laboratory for analyzing its raw material and product; this department has been maintained for the last 12 years. The sales during the past year amounted to \$1,500,000, five times those of 10 years ago and 25 times those of the year ending June 30, 1884. In March, 1907, alone the business amounted to more than that of any entire year up to 1890. The present officers are as follows: Frederick W. Sivyver, president; Frederick L. Sivyver, vice-president; Helmus B. Wells, second vice-president; D. Ralph Day, secretary and John M. Potter, treasurer.

### PERSONAL.

T. M. Girdler, formerly assistant superintendent of the merchant mills of the Colorado Fuel & Iron Company at Pueblo, Colo., is now superintendent of the rolling mill department of the Atlanta Steel Company, Atlanta, Ga. J. B. Johnston, superintendent of the hoop and rod mills of the Atlanta Company, retires July 15, to be succeeded by W. J. Hartley, who will be assistant to Mr. Girdler.

Oscar Winter, who for more than six years has been steam expert of the National Tube Company, formerly the Lorain Steel Company, Lorain, Ohio, has opened a consulting office in the Rockefeller Building, Cleveland, Ohio, where he will give special attention to expert work in steam engineering.

Albert H. Fritz, formerly with the Birdsboro Steel Foundry & Machine Company, Birdsboro, Pa., in the diamond drilling and belt lacing machine departments, is now connected with the Chapman Valve Mfg. Company, 1011 Filbert street, Philadelphia.

W. H. Reeves and Ramsay Skinner have organized the Reeves & Skinner Machinery Company, with offices in the Chemical Building, St. Louis, Mo. The company will deal principally in pumping and condensing apparatus, hydraulic and pneumatic machinery, gas engines and gas producers. Mr. Reeves was formerly the St. Louis manager of the International Steam Pump Company, and Mr. Skinner held a similar position at Kansas City.

The King of Greece has conferred upon Geo. G. Blackwell the Gold Cross of Officer of the Royal Order of the Savior, this decoration being made in recognition of his services in connection with the development of the mining industries of Greece. Mr. Blackwell is chairman of the firm of Geo. G. Blackwell, Sons & Co., Ltd., Liverpool and London, and is well known in this country, which he has frequently visited.

Frederick A. Waldron has opened an office at 37 Wall street, New York City, for consulting practice in industrial engineering, in which he has had practical experience extending over a score of years. His specialties will be selecting profitable factory sites, designing and superintending the erection of new factories and power plants, preparing reports on existing power and industrial plants and suggesting modifications, and recommending means for increasing shop economies and improving shop organization.

Chairman E. H. Gary of the United States Steel Corporation sailed for Europe on Tuesday.

Charles S. Powell has resigned as general agent of the Westinghouse Electric & Mfg. Company, and the office has been abolished. Mr. Powell has not definitely decided as to his future connection. His address until the fall is 925 West End avenue, New York City.

At a special meeting of the directors of the New York Car Wheel Company, Buffalo, N. Y., held July 3, Solomon Ginsburg was elected president to succeed the late Joseph H. Berry, W. G. Smith was elected vice-president and J. A. Venable secretary and treasurer.

Joseph Wharton of Philadelphia, who is now in London, is reported to be seriously ill.

Henry G. Bradley was made a partner in the engineering firm of Stone & Webster, Boston, Mass., on June 30.

Henry C. Frick sailed for Europe on Tuesday.

Marshall I. Smith, Bristol, Conn., announces that he has purchased the Ira B. Smith Company, and in the future the business will be conducted under the firm name of M. I. Smith, manufacturing light hardware and specialties, dies and punches. He is prepared to make quotations on special work or to furnish tools to produce any article.

Work has begun on the electrification of 150 miles of the Harriman suburban lines out of San Francisco and Oakland, where it is claimed that the largest suburban business of any railroad in the world will be done by the trolley electric system when the improvement is completed.

# June Pig Iron Statistics.

## Productive Capacity Still Increasing.

### Actual Output Nearly Stationary.

While the number and the capacity of the blast furnaces in operation increased during June, the weekly capacity going up from 523,220 tons to 527,830 tons, the output remained nearly stationary, because quite a number of the furnaces were not doing quite as well as they should have done. The actual production in June was 2,231,575 tons, or 74,385 tons per day, while it was 2,295,505 tons in May, or 74,485 tons per day.

In the table below is given the production of the coke and anthracite furnaces in June, as compared with the figures for the four months preceding:

Monthly Pig Iron Production—Gross Tons.

	February. (28 days)	March. (31 days)	April (30 days)	May. (31 days)	June. (30 days)
New York....	126,055	151,142	142,241	145,694	141,044
New Jersey...	29,616	36,470	30,715	30,814	32,360
Lehigh Valley.	51,485	60,754	63,926	70,540	66,097
Schuylkill Val.	57,388	61,601	59,670	64,069	57,184
Lower Susquehanna and Lebanon Val.	53,010	62,946	67,665	77,274	67,916
Pittsburgh Dis.	481,868	511,637	530,527	537,088	544,247
Shenango Val.	154,966	172,748	175,441	156,103	157,975
West. Penn....	111,933	121,948	129,079	133,720	131,935
Md., Va., and Kentucky...	83,135	93,080	96,210	99,461	79,028
Wheeling Dis.	98,929	97,158	118,747	122,666	105,479
Mahoning Val.	168,187	179,001	177,425	191,473	187,731
Central and North. Ohio.	171,838	185,598	168,537	158,394	169,830
Hocking Valley and Hanging Rock.....	33,606	33,792	28,677	31,338	35,365
Ill., Mich., Minn., Wis., Mo. and Colo.....	259,964	278,655	252,714	291,789	287,633
Alabama.....	126,642	142,281	142,174	151,454	132,630
Tennessee, Georgia and Texas.....	36,446	37,646	35,494	33,628	35,121
Totals.....	2,045,068	2,226,457	2,219,242	2,295,505	2,231,575

The production of anthracite and coke pig iron during the first half of 1907, according to our records, compares as follows with the official reports for half yearly periods of the American Iron and Steel Association:

	Gross tons.
First half, 1907.....	13,223,454
Second half, 1906.....	12,499,656
First half, 1906.....	12,374,528
Second half, 1905.....	11,646,789
First half, 1905.....	10,992,667

To this there must be added the production of charcoal pig iron, which amounted to 170,512 tons for the first half of 1905, to 182,416 tons for the second half of 1905, to 207,722 tons for the first half of 1906 and to 225,285 tons for the second half of 1906. It is safe, therefore, to estimate the total production of pig iron during the first half of 1907 at 13,500,000 tons.

**Production of Steel Companies.**—Returns from all the plants of the United States Steel Corporation, the Cambria, Pennsylvania, Maryland, Lackawanna, Wheeling, Republic, Jones & Laughlin, La Belle, Bethlehem, Calumet and Colorado companies show the following totals of products month by month. We present also separately monthly figures of the production of spiegeleisen and ferromanganese, which is included in the total:

Production of Steel Companies.—Gross Tons.

	Fig.—Total production.			Spiegeleisen and ferromanganese.	
	1905.	1906.	1907.	1906.	1907.
January.....	1,129,042	1,358,015	1,406,397	26,305	21,477
February.....	1,027,937	1,226,760	1,317,923	26,988	19,444
March.....	1,232,255	1,400,395	1,424,827	23,595	31,091
April.....	1,222,710	1,333,591	1,446,788	28,054	26,527
May.....	1,287,438	1,372,423	1,470,080	29,447	28,822
June.....	1,149,404	1,293,437	1,457,230	22,737	30,942
July.....	1,114,409	1,323,391	.....	20,153	.....
August.....	1,186,050	1,237,485	.....	18,327	.....
September.....	1,262,033	1,264,380	.....	24,078	.....
October.....	1,370,960	1,452,200	.....	23,517	.....
November.....	1,334,644	1,411,350	.....	29,119	.....
December.....	1,356,962	1,445,528	.....	21,707	.....

Among the furnaces which resumed during June were one Lock Ridge of the Thomas Iron Company, Edgar Thomson C in Pittsburgh, No. 1 South Sharon, Dover in Ohio, Milton in the Hanging Rock region, one North Works furnace of the Illinois Steel Company, No. 4 Ensley and Johnson City and Rockdale in Tennessee, No. 6 Carrie and Etowah in Alabama, both new furnaces, were started in June. There were blown out during June the Allentown Rolling Mill furnace and two Hokendauqua in the Lehigh Valley, one Allegheny in Virginia and one Ensley.

Coke and Anthracite Furnaces in Blast.

Location of furnaces.	Total number of stacks.	July 1. Number in blast.	Capacity per week.	June 1. Number in blast.	Capacity per week.
New York:					
Buffalo.....	14	14	30,812	14	20,327
Other New York....	10	4	4,229	4	3,571
New Jersey.....	8	7	7,421	7	6,797
Spiegel.....	2	2	129	1	161
Pennsylvania:					
Lehigh Valley.....	25	18	13,157	20	14,945
Spiegel.....	3	3	927	3	983
Schuylkill Valley....	14	13	12,526	13	14,241
Spiegel.....	1	1	817	1	710
Low. Susquehanna.	8	6	7,555	6	8,407
Spiegel.....	1	1	661	1	668
Lebanon Valley....	10	10	7,630	10	8,365
Pittsburgh Dist....	42	42	121,317	40	119,518
Spiegel.....	3	3	3,339	3	2,943
Shenango Valley....	20	20	37,800	19	36,861
West Penn.....	25	21	30,785	21	30,471
Maryland.....	4	4	7,945	4	9,156
Wheeling Dist....	14	13	25,902	13	26,544
Ohio:					
Mahoning Valley....	18	18	43,470	18	43,232
Central and North.	21	21	42,538	20	37,359
Hocking Valley and Hanging Rock....	12	12	8,252	11	8,129
Illinois.....	23	23	51,381	21	49,814
Spiegel.....	1	1	922	2	1,398
Minnesota.....	1	1	1,295	1	1,463
Wisconsin.....	6	5	4,971	5	4,271
Missouri.....	1	1	772	1	702
Colorado.....	5	5	8,569	4	6,692
Spiegel.....	1	1	413	1	354
The South:					
Virginia.....	23	16	10,419	17	10,852
Kentucky.....	7	4	2,327	4	2,811
Alabama.....	46	31	32,347	30	34,377
Tennessee.....	18	13	7,358	13	7,507
Georgia and Texas.	3	2	784	2	588
Totals.....	390	336	527,830	330	523,220

The active weekly capacity in coke and anthracite iron has shown the following fluctuations since January 1, 1903:

	Capacity per week.		Capacity per week.
July 1.....	527,830	March 1.....	403,157
June 1.....	523,220	February 1.....	405,792
May 1.....	524,538	January 1, 1905.....	377,879
April 1.....	497,456	December 1, 1904.....	357,846
March 1.....	511,035	November 1.....	334,249
February 1.....	492,359	October 1.....	319,249
January 1, 1907.....	507,397	September 1.....	291,573
December 1, 1906.....	513,860	August 1.....	246,092
November 1.....	500,580	July 1.....	272,301
October 1.....	469,665	June 1.....	336,107
September 1.....	441,426	May 1.....	368,244
August 1.....	449,908	April 1.....	337,257
July 1.....	460,570	March 1.....	308,751
June 1.....	472,622	February 1.....	273,692
May 1.....	484,031	January 1, 1904.....	185,636
April 1.....	484,240	December 1, 1903.....	244,156
March 1.....	479,737	November 1.....	273,715
February 1.....	482,156	October 1.....	353,142
January 1, 1906.....	463,673	September 1.....	360,197
December 1, 1905.....	475,814	August 1.....	353,681
November 1.....	460,449	July 1.....	384,825
October 1.....	445,468	June 1.....	388,178
September 1.....	412,563	May 1.....	373,496
August 1.....	410,088	April 1.....	386,215
July 1.....	408,617	March 1.....	347,424
June 1.....	443,092	February 1.....	335,239
May 1.....	452,031	January 1, 1903.....	346,073
April 1.....	439,564		

The Electrical Show will open at the Madison Square Garden, New York, on September 30, with exhibits ranging from a miniature one-eighth of a candle power incandescent lamp to a 10-ton dynamo. The Garden will be laid out in three avenues—Edison, Westinghouse and Franklin—running from east to west, with three cross streets running from north to south.

## NEWS OF THE WORKS.

### Iron and Steel.

William Swindell & Brothers, German National Bank Building, Pittsburgh, have recently taken contracts as follows: For erecting crucible steel melting furnaces for the Simonds Mfg. Company, Chicago, Ill.; Burgess & Dickson, Dunkirk, N. Y.; Ludlum Steel & Spring Company, Watervliet, N. Y., and also for the Collins Company, Collinsville, Conn. They are also erecting five heating furnaces and one large converting furnace for the latter company. They are erecting a number of sheet and pair furnaces, gas producers and five regenerative annealing furnaces for the La Belle Iron Works, Steubenville, Ohio; a number of gas producers at Sharon, Pa.; Bridgeport, Ohio, and Winchester, Ind.; regenerative heating furnaces and annealing furnaces, Crescent plant of the Crucible Steel Company of America; one 20-ton air furnace for the roll and machine works of the American Sheet & Tin Plate Company at Canton, Ohio. They have just completed two basic open hearth and one regenerative heating furnace for the West Leechburg Steel Company; one 20-ton open hearth furnace, Lorain Steel Company, Johnstown, Pa.; one 20-ton open hearth furnace, Pratt & Letchworth Company, Buffalo, N. Y.; one 25-ton open hearth furnace with gas producers, Harrison plant of the Crucible Steel Company of America, Harrison, N. J.

The Standard Tin Plate Company, Canonsburg, Pa., is running its various departments to full capacity, and has orders on its books for several months ahead.

The Cherry Valley Iron Company is making improvements to its Fannie Furnace, at West Middlesex, Pa., which will include the installation of another McClure stove, 22 x 70 ft., making four at the plant, also a Mullin gas washer, a duplicate of the original washer installed.

Milton Furnace of the Wellston Iron & Steel Company, Wellston, Ohio, blew in June 8.

No. 1 Furnace of the Illinois Steel Company, at the North Works, Chicago, Ill., blew in June 20.

Shelby Furnace, of the Shelby Iron Company, Shelby, Ala., will go in blast this month.

Hattie Ensley Furnace of the Sloss-Sheffield Steel & Iron Company, Sheffield, Ala., blew in June 29.

No. 4 Ensley Furnace, of the Tennessee Coal, Iron & Railroad Company, Ensley, Ala., blew in June 6, and No. 1 Ensley Furnace blew out June 12.

### General Machinery.

The Bicknell Mfg. & Supply Company, Janesville, Wis., jobber of iron and steel, tools and supplies, and maker of iron and woodworking machinery, has been compelled by the growth of its manufacturing business to build a new plant for its accommodation. This plant, located on the Chicago & Northwestern Railroad tracks in the northern part of the city, has been completed and is now occupied. With the increased facilities thus provided the company is able to fill its orders with greater promptness.

The Crescent Rotary Engine Company, Spokane, Wash., has completed its plant at Yardley, which is now in operation. Three sizes of engines are at present being made, 6, 20 and 200 hp., respectively. The German rights for the manufacture of this engine have been sold to W. Scheck & Brother, who represent a German firm. As soon as it is completed a 200-hp. engine will be shipped to Germany for the purpose of demonstrating its merits.

The J. J. Lacy Company, Baltimore, Md., proprietor of the Industrial Iron Works, has completed plans for an addition to its plant, 26 x 87 ft.

The Rome Locomotive & Machine Works, Rome, N. Y., has awarded contract to the McClintic-Marshall Construction Company, Pittsburgh, Pa., for an addition to its boiler shop, 80 x 160 ft., and 30 ft. high, work of construction to be commenced at once. New machinery will be installed, which will include traveling cranes, hydraulic riveters and flanges, and new punching and shearing machines. When the addition is completed it will add materially to the output.

Frank W. Watson, who now operates a machine shop at Albany, Ore., and his brothers, Sydney, Clavin and Joseph, will establish a plant in that city for the manufacture of logging engines, machinery, and for general foundry work. A site for the plant has not yet been selected, but it is the intention to locate on the Southern Pacific Railroad.

Since operating its new plant the Crescent Machine Company, Leetonia, Ohio, has greatly increased facilities, and announces that it is able to make prompt delivery on all Crescent machines. The new buildings are located on a 12-acre tract of land, cover about 50,000 sq. ft. of floor space, and are practically fireproof. The buildings are fully equipped with modern machinery for the economic production of Crescent machines.

The Joplin & Pittsburgh Railroad has purchased three acres of land, with a frontage of 415 ft. on Fourth street, Joplin, Mo., on which it intends to erect shops and car barns.

The recent fire at the plant of the American Engineering & Foundry Company, Los Angeles, Cal., did very little damage, and the various departments are now in full operation.

The Bates Forge Company, Indianapolis, Ind., has increased its capital stock from \$50,000 to \$75,000. Franklin P. Bates is president, and Fred W. Rubin, secretary.

The Acme Machine Works has been incorporated at Delphi, Ind., with \$5000 capital stock, to manufacture machinery, and to do general machine work. The incorporators are I. Dreifus, J. J. Shultz, and E. E. Kirkpatrick.

### Power Plant Equipment.

The Lawton electric light plant at Lawton, Okla., has been purchased by Larsch & Lender. The business will be continued under the name of the Comanche Light & Power Company.

The contract for the installation of a municipal electric light plant at Armour, S. D., has been awarded to John Absher, Wagner, S. D. The building will be of cement blocks, and the plant is to be ready for operation by the middle of October.

Proposals for the construction of an addition to the power house of the municipal electric light plant at Crystal Falls, Mich., will be received by the city clerk up to July 10.

In addition to two new plant buildings recently completed, the Marion Malleable Iron Works, Marion, Ind., is planning the construction of a third building for the accommodation of its core department.

C. W. Shumway & Sons, Batavia, Ill., makers of high grade gray iron castings, have resumed operations after having been closed down for improvements and repairs. These include a new steel roof on the iron foundry and the installation of Sharp rocking grates for heating the core ovens.

The Union Steam Pump Company, Battle Creek, Mich., has secured the property on South Jefferson avenue, between the Grand Trunk Railroad and Noble street, and is planning the entire reconstruction of its present plant and the erection of new buildings, which, when completed, will give the company about four acres of floor space. The new buildings will include a three-story office structure, a warehouse, testing, erecting, and stock rooms, and the boiler house. The present machine shop will be replaced by a new building, doubling its present capacity, and at the south end of the new shop a coal shed and boiler room are to be erected. The remainder of the plant will be remodeled and refitted, and a new chipping room added to the foundry. Modern machinery will be installed throughout the plant, including pneumatic tools, and wherever practicable the machines will be driven by independent motors. The plant will be served throughout by electric traveling cranes.

The Ontario Light & Traction Company, Canandaigua, N. Y., is remodeling its power station by replacing the open arc machines and all steam machinery with a direct connected three-phase unit at the water wheels.

By order of the court the Woolley Foundry & Machine Works, Anderson, Ind., will be sold by the receiver, the Andersen Trust Company, July 30. At the time the receiver was appointed, in May, the liabilities were placed at \$27,000, with assets twice the amount. W. J. Woolley, general manager, on whose application the receiver was appointed, said the company's embarrassment was due to the unexpected expense in perfecting gas engines and gas producers, recently patented by the company.

The New York State Steel Company, of Buffalo, N. Y., after a thorough trial of a 4000-hp. We-Fu-Go water softening and purifying system manufactured by the Wm. B. Scaife & Sons Company, Pittsburgh, Pa., has placed an order for another 4000-hp. system of the same type, to be added to the present one, making a total of 8000 hp.

### Foundries.

The Chicago Malleable Castings Company, West Pullman, Chicago, Ill., will erect immediately a new brick building, 75 x 250 ft., to be used entirely for the manufacture of cores. Considerable attention has been given to plans which will insure light and ventilation, as well as the arrangement for the economical handling of materials. Convenient side tracks will permit the unloading of sand, resin, &c., directly into storage bins. The materials will then be put through mixing machinery, and from this section passed on to the coremakers. The finished cores are then taken to the several small and large ovens, suitable for the required size of the core, and when baked placed on cooling racks. At this point they are inspected, counted and handed to the molders. The new building will be placed in the center of a group of molding departments, making it easily accessible and avoiding the usual long haul to the molders' benches. The company has not yet purchased its sand mixing machinery.

### Bridges and Buildings.

The Fort Pitt Bridge Works, House Building, Pittsburgh, is shipping structural steel for a merchandise freight terminal way to be erected at Flatbush avenue, Brooklyn, by the Long Island Railroad. This company is also furnishing the structural steel for the Broadway elevated structure being built for the Brooklyn Heights Railroad. It is finishing a contract for steel work for the new Lackawanna terminal and train shed of the Delaware, Lackawanna & Western Railroad at Hoboken, which is nearing completion.



The Stone City Steel Construction Company has been incorporated at Bedford, Ind., with \$20,000 capital stock. The directors are: Johnson A. Coleman, Edward A. Sohn and Clinton S. Norton.

#### Fires.

The machine shops and supply houses of the De Queen & Eastern Railroad, De Queen, Ark., were recently destroyed by fire, the loss being estimated at \$30,000.

The plant of the American Steel Foundries, Indian Harbor, Ind., was burned July 4, the loss being about \$50,000.

The power house of the Maitland Electric Light & Power Company, St. Joseph, Mo., was damaged \$10,000 by fire June 27.

The plant of the American Radiator Company, St. Louis, Mo., was partially burned June 24.

The machine shops of the McDonald Bros. Pitless Scale Company, Pleasant Hill, Mo., were damaged \$10,000 by fire July 4.

The plant of the Phoenix Asbestos Mfg. Company, Philadelphia, Pa., was burned July 6, the loss being about \$10,000.

#### Hardware.

The Clauss Shear Company, Fremont, Ohio, is making a number of improvements in and additions to its plant. The additions consist of two brick buildings, each three stories high, 40 x 90 ft. One of these buildings will be devoted to the manufacture of the company's safety razor, for which there is a steadily increasing demand, to cope with which present facilities are inadequate. The other building will be connected with the shear department, the ground floor being used for office purposes. The company is now employing nearly 400 persons, and with the completion of the new buildings about 100 more will be added to the payroll.

The Fuel Economy & Mfg. Company, Detroit, Mich., has removed from 42 Jefferson avenue to 54-56 Jefferson avenue. The company, which was organized for the manufacture and sale of the Burton fuel economizer, has added the jobbing of composition roofings, metal ceilings and builders' supplies.

The H. B. Sherman Mfg. Company, Battle Creek, Mich., maker of brass goods, is erecting a new factory building, 50 x 150 ft., adjoining the present plant, which will be ready for occupancy about July 15. The new building will be devoted to the manufacture of Sherman patent roofing nails, the growing demand for which necessitated this enlargement.

The Pittsburgh Screw & Bolt Company, Pittsburgh, has recently broken ground on its new site on Penn avenue, between Twenty-fourth and Twenty-fifth streets, adjoining its present plant, on which it will erect a three-story steel and brick building, 100 x 100 ft. The contract has been let to the Ritter-Conley Mfg. Company and the E. C. Wilcox & Co., both of Pittsburgh, and it is expected that the building will be completed by September 1. The latest improved machinery will be installed, the greater portion of which has already been delivered. Part of the third floor will be used for office purposes. With this addition the company will be able to increase its capacity of machine and carriage bolts, lag screws, cold and hot pressed nuts 25 per cent., and the different sizes will range from 3-16 to 4 1/2 in. in diameter.

The McKinney Mfg. Company, Allegheny, Pa., manufacturer of hinges and door hangers, is preparing to build a three-story addition to its plant, to be used as a warehouse.

#### Miscellaneous.

The Auer Register Company, Cleveland, Ohio, has been incorporated, with a capital stock of \$25,000, by C. S. Auer and others, and is now established in business on Long street. The company will manufacture the Auer register, that was formerly made in Toledo, Ohio.

The Bradford Supply Company, Bradford, Pa., recently organized, has established headquarters at 140 Main street, where a complete line of oil and gas well supplies is carried. John McCrum is president; Stearns Marshall, secretary, and W. L. Gafney, treasurer.

The Goodspeed Mfg. Company, Colorado Springs, Colo., has completed its plant buildings and will be ready for operation as soon as the machinery is installed. The chief product of the company will be a positive safety valve for stationary and locomotive engines.

The Edison Portland Cement Company, Stewartsville, N. J., which has had its plant in continuous operation for 26 months, has closed it down for making general repairs, and for connecting the new buildings, recently constructed, with the old plant. When operations are resumed August 1 the capacity of the plant will be considerably increased.

The Rolf-Martin Company has been incorporated at Fort Wayne, Ind., with a capital stock of 15,000, to deal in castings, plumbers' supplies, &c. The directors are Herman L. Rolf, Emmett Martin, Albert Rolf, Daniel A. Newcomer and Chas. V. Jacobs.

The Harrington Signal Company has been formed to market railroad appliances, with \$50,000 capital. E. M. Tierney is president, G. W. Sweeney, vice-president, and S. H. Harrington, secretary and chief engineer. The company expects to put out a number of railroad devices, and at first will have its product

made by contract. Later on it is probable that the company will build its own plant. The office is at 120 Liberty street, New York.

The Pittsburgh Valve, Foundry & Construction Company, Pittsburgh, has been awarded the following contracts: Illinois Steel Company, South Chicago, Ill., large valves for new water plant; Gary plant of United States Steel Corporation, 250 hydraulic operating valves for the new open hearth plant; Brown & Co., Pittsburgh, remodeling steam piping system for the whole mill; St. Louis Plate Glass Company, Valley Park, Mo., a condenser system.

The Duff Patents Company, a partnership concern, manufacturing the Duff and Bradley gas producers, and the Duff Construction Company, an incorporated company, with works in Allegheny, Pa., manufacturer of tank and other kinds of steel plate work, have consolidated their interests, and will hereafter be known as the Duff Patents Company, having been incorporated.

## OBITUARY.

WILLIAM F. JARVIS, Detroit, Mich., died June 27 from appendicitis, aged 47 years. He was born at Palmyra, N. Y., entered Toronto College, and completed his education in the Sheffield Scientific School of Yale University. He engaged in business in Detroit in 1878, afterward becoming the resident partner of the pig iron firm of Charles Himrod & Co., Chicago, whose Detroit business subsequently passed to William F. Jarvis & Co. He was one of the founders and the first treasurer of the American Radiator Company. He retired from active business in 1904.

BOWEN WHITING PIERSON, who was connected with the Alberger Condenser Company and its allied interests, died suddenly of apoplexy July 4, at his home at Bridgehampton, Long Island, aged 49 years. He was born at Victor, N. Y. In the early eighties he became connected with Henry R. Worthington in a financial capacity and shortly after the formation of the International Steam Pump Company, which took in the Worthington interest, he organized the Alberger Condenser Company with Louis R. Alberger. He was secretary and treasurer of this company and had charge of the financial end of the business. When the Newburgh Ice Machine & Engine Company was formed Mr. Pierson was made treasurer of that corporation, and on the formation of the Alberger Pump Company he assumed the office of secretary and treasurer of that organization. For many years he took an active interest in the affairs of the Biological and Genealogical societies, New York. He was also a member of the Grolier and City Clubs and the Century Association. He is survived by a wife and daughter.

JAMES MACBETH, master car builder of the New York Central, Buffalo, N. Y., died July 5, after a brief illness, during which he was twice obliged to undergo surgical operations. He was born in Aberdeen, Scotland, and began railroad life in this country in 1859 as an apprentice in the machine shops of the Great Western of Canada. In 1864 he became foreman of repairing and rebuilding of locomotives on the New York Central. After serving with several railroad companies in various capacities, in 1893 he was appointed to the position now made vacant by his death. For the past several years Mr. Macbeth was a member of the Board of Councilmen of Buffalo, and for a time was its presiding officer. He had previously been a member of the Board of Park Commissioners. As one of the founders of the Central Railway Club, he had served its interest faithfully and energetically in a number of capacities, and was one of its ex-presidents.

JOHN S. WILBRAHAM, secretary and treasurer of the Wilbraham-Green Blower Company, Philadelphia, Pa., died at Edinburgh, Scotland, July 3. He was born in Philadelphia, January 16, 1860, and was the son of Thomas Wilbraham, who founded the firm of Wilbraham Brothers in 1854. He became connected with his father's business in early life, and was made secretary and treasurer of the company some 20 years ago. Mr. Wilbraham had been in ill health for several years, and sailed for Europe on June 15, hoping to regain his health. His death removes all but one of the Wilbraham family from the firm, Thomas W. Green, chief engineer, being the only remaining member. Mr. Wilbraham is survived by his widow.

## The Iron and Metal Trades

The monthly returns of the manufacturers of Pig Iron to *The Iron Age* show that production in June was practically at the same rate as it was in May. The output in the 30 days of June was 2,231,575 tons, or 74,385 tons per day, while it was 2,295,505 tons in May, or 74,485 tons per day. When Charcoal Iron is included the total production of Pig Iron during the first half of 1907 was 13,500,000 tons, against 12,675,000 tons during the second half of 1906, and 12,582,000 tons during the first half of 1906. At the rate of production at which the industry entered the second half of 1907 an even larger output will be available. On July 1 the active Coke and Anthracite furnaces had a total capacity of 527,830 tons per week, the largest on record. It must be noted, however, that a good many of the furnaces did not in June come up to their usual tonnage.

From all the distributing markets come reports of the same tenor, as to Pig Iron dullness, with occasional indications of easing prices, particularly on off grades and misfit Irons. Foreign Irons are still being offered, but there is little temptation to importers to operate, and it looks as though the English market had broken away from the domination of ours, and is chiefly swayed now by the requirements for Germany.

In order to secure relief from the scarcity of Steel for certain purposes the Carnegie Steel Company's plant at Youngstown has been taken off from Steel Rails and Sheet Bars for the third quarter, and will make Steel Billets exclusively. In the East the Steel market is quiet, with Open Hearth Billets available at \$32, delivered.

Until some definite conclusions have been reached by the Joint Committee of Railroads and Mill Experts on the specifications very little is likely to be done in placing orders for Steel Rails for 1908 delivery. The only large sale recently made for this year's delivery is that of the Lackawanna Steel Company to the San Pedro & Los Angeles, involving 13,500 tons. There is an inquiry in the market for 12,000 tons for Japan.

There have been few transactions in Structural Material during the past week, but there is a good deal of figuring being done and a satisfactory tonnage is in sight.

During the week the material for one lake boat was placed, and shipbuilders are negotiating for two or three additional vessels.

Generally speaking, in the finished trades new business is somewhat lighter, but the pressure for deliveries is as heavy as ever. In the lighter lines the Wire and Tube trades are operating at the maximum rate, and the outlook is regarded as particularly satisfactory.

Cast Iron Pipe manufacturers, who have been enjoying unusual prosperity for a considerable time, report some weakening in prices.

The Scrap markets are weak in the leading centers. Chicago notes railroad offerings of over 13,000 tons, and the fear is expressed that prices may further recede under the pressure.

June was a record breaker in the shipments of Iron Ore from the lakes. The total tonnage shipped from all the docks was 6,433,369 tons.

It appears that efforts will be made to hold the Copper market at 22c. for Electrolytic for the third quarter. Whether consumption will justify that figure remains to be seen.

## A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,  
Declines in Italics.

At date, one week, one month and one year previous.

July 10, July 3, June 12, July 12,  
1907. 1907. 1907. 1906.

### PIG IRON, Per Gross Ton:

Foundry No. 2, Standard, Philadelphia .....	\$23.00	\$23.50	\$24.50	\$18.25
Foundry No. 2, Southern, Cincinnati .....	23.75	24.25	24.25	16.00
Foundry No. 2, Local, Chicago ..	25.50	25.50	26.50	18.25
Bessemer, Pittsburgh .....	23.90	24.15	24.40	18.10
Gray Forge, Pittsburgh .....	22.90	23.15	23.15	16.35
Lake Superior Charcoal, Chicago ..	27.00	27.00	27.50	19.00

### BILLETS, &c., Per Gross Ton:

Bessemer Billets, Pittsburgh ..	30.00	30.00	29.50	27.00
Forging Billets, Pittsburgh ..	34.00	34.00	34.00	33.00
Open Hearth Billets, Phila. ....	32.50	32.50	32.50	29.00
Wire Rods, Pittsburgh .....	36.50	36.50	37.00	34.00
Steel Rails, Heavy, Eastern Mill ..	28.00	28.00	28.00	28.00

### OLD MATERIAL, Per Gross Ton:

Steel Rails, Melting, Chicago ..	18.00	18.75	18.50	14.00
Steel Rails, Melting, Phila. ....	17.75	18.25	20.00	15.75
Iron Rails, Chicago .....	24.50	24.50	24.50	21.25
Iron Rails, Philadelphia .....	25.00	26.00	27.50	20.00
Car Wheels, Chicago .....	24.50	25.00	25.50	18.00
Car Wheels, Philadelphia .....	25.00	25.00	25.50	16.00
Heavy Steel Scrap, Pittsburgh ..	18.00	18.25	18.50	15.75
Heavy Steel Scrap, Chicago .....	16.50	16.50	16.00	13.00
Heavy Steel Scrap, Philadelphia ..	17.50	18.00	19.00	15.50

### FINISHED IRON AND STEEL,

Per Pound:

	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia ..	1.83½	1.83½	1.83½	1.63½
Common Iron Bars, Chicago ..	1.78	1.78	1.78	1.66½
Common Iron Bars, Pittsburgh ..	1.70	1.70	1.75	1.50
Steel Bars, Tidewater, New York ..	1.86	1.86	1.84½	1.64½
Steel Bars, Pittsburgh .....	1.60	1.60	1.60	1.50
Tank Plates, Tidewater, New York ..	1.86	1.86	1.86	1.74½
Tank Plates, Pittsburgh .....	1.70	1.70	1.70	1.60
Beams, Tidewater, New York ..	1.86	1.86	1.86	1.84½
Beams, Pittsburgh .....	1.70	1.70	1.70	1.70
Angles, Tidewater, New York ..	1.86	1.86	1.86	1.84½
Angles, Pittsburgh .....	1.70	1.70	1.70	1.70
Skelp, Grooved Steel, Pittsburgh ..	1.90	1.90	1.85	1.57½
Skelp, Sheared Steel, Pittsburgh ..	1.90	1.90	1.90	1.60

### SHEETS, NAILS AND WIRE,

Per Pound:

	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh .....	2.50	2.50	2.50	2.40
Wire Nails, Pittsburgh .....	2.00	2.00	2.00	1.75
Cut Nails, Pittsburgh .....	2.05	2.05	2.05	1.85
Barb Wire, Galv., Pittsburgh ..	2.45	2.45	2.45	2.30

### METALS, Per Pound:

	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York .....	22.25	23.50	24.25	18.50
Electrolytic Copper, New York ..	22.00	22.00	23.00	18.25
Spelter, New York .....	6.30	6.35	6.50	6.00
Spelter, St. Louis .....	6.12½	6.27½	6.40	5.85
Lead, New York .....	5.30	5.25	5.75	5.80
Lead, St. Louis .....	5.15	5.15	5.65	5.70
Tin, New York .....	41.35	42.75	42.10	36.00
Antimony, Hallett, New York ..	10.00	12.00	14.00	23.00
Nickel, New York .....	45.00	45.00	45.00	45.00
Tin Plate, 100 lb., New York ..	\$4.09	\$4.09	\$4.09	\$4.09

## Chicago.

FISHER BUILDING, July 10, 1907.—(By Telegraph.)

The market throughout presents a typical midsummer aspect. A generally quieter tone in the development of new business prevails, though in a few departments of finished material but little abatement in demand is noticed. This is particularly true of Tubular goods, and to some extent of Sheets and Steel Bars. The feature of the situation is not that demand has diminished, but that, in view of the seemingly adverse influences operating against it, it has not suffered greater curtailment. Present conditions proclaim the soundness of underlying forces. A renewal of interest in Steam Rail purchases awaits the settlement of questions of quality and specifications now under discussion. Of Structural Material embraced in plans for three buildings in Western cities, 3300 tons is up for figures. Of the large amount of tonnage for building structures on which estimates have already been given, much is slow in coming to closure. Requirements for highway and railroad bridge construction are furnishing considerable tonnage. Some curtailment in various lines of mill production will result from necessary shutdowns for repairs, which on account of pressing demands will be brief as possible. The Pig Iron market is barren of interest or activity. Beyond the softening of spot Iron prices noted last week there has been no relaxation in prices. Railroad offerings of Scrap this week total over 13,000 tons. In the present state of the market it would not be at all surprising if prices should sag still further under the added weight of this tonnage.

**Pig Iron.**—Business has dwindled to a point of almost



complete stagnation. Buying for forward delivery is practically suspended, and the demand for spot iron is exceedingly light. Holiday lethargy was doubtless one of the effects contributing to the extreme dullness of last week, but the opening of the current week has brought no reaction. Melters, however, are generally busy, and the furnace interests are in daily receipt of letters urging the maintenance of schedule shipments on contracts. It seems evident from the absence of inquiries in the market that consuming interests are not yet closely approaching the limit for which provision has been made. No indication of anxiety concerning third quarter is apparent, though under present conditions it is hardly expected that buyers will bestir themselves much in advance of their actual needs, the furnace interests are confidently relying upon a large demand for fourth quarter requirements. A knowledge of the fact that, barring a sudden and unforeseen decrease in consumption, a large tonnage must come into the market for this period, is the prop that so firmly sustains prices. No further softening has developed, either in spot or forward delivery prices. No. 2 Foundry is still held at \$20, Birmingham, for fourth quarter, and \$18.50 for the first quarter of 1908. The quotation is, to some extent, nominal, since several interests decline to name prices for this delivery in the absence of any purchasing interest. Northern No. 2 Foundry is quoted at \$25, Chicago, for last quarter. The following prices are for July, August and September delivery, f.o.b. Chicago, the spread indicated representing the difference between the earlier and later dates of this period:

Lake Superior Charcoal.....	\$27.00 to \$27.50
Northern Coke Foundry, No. 1.....	26.00 to 26.50
Northern Coke Foundry, No. 2.....	25.50 to 26.00
Northern Coke Foundry, No. 3.....	25.00 to 25.50
Northern Scotch, No. 1.....	26.00 to 26.50
Ohio Strong Softeners, No. 1.....	26.00 to 26.50
Ohio Strong Softeners, No. 2.....	25.50 to 26.00
Southern Coke, No. 1.....	26.35 to 26.85
Southern Coke, No. 2.....	25.85 to 26.35
Southern Coke, No. 3.....	25.35 to 25.85
Southern Coke, No. 4.....	24.35 to 24.85
Southern Coke, No. 1 Soft.....	26.35 to 26.85
Southern Coke, No. 2 Soft.....	25.85 to 26.35
Southern Gray Forge.....	22.35 to 22.85
Southern Mottled.....	22.35 to 22.85
Malleable Bessemer.....	25.50 to 26.00
Standard Bessemer.....	25.90 to 26.40
Jackson Co. and Kentucky Silvery, 6 %	31.40 to 31.90
Jackson Co. and Kentucky Silvery, 8 %	32.40 to 32.90
Jackson Co. and Kentucky Silvery, 10 %	33.40 to 33.90

(By Mail.)

**Billets and Rods.**—Nothing noteworthy either in inquiries or orders is heard of in Forging Billets. Such small lots as have been moved have commanded the current range of prices, from \$36 to \$38. In view of the continuance of a heavy demand for Wire products there is small prospect of a freer movement in Rods in the near future. Prices are unchanged, at \$37 to \$38, Pittsburgh.

**Rails and Track Supplies.**—As was anticipated, the market, so far as the buying of Standard Section Rails is concerned, is extremely quiet. No transactions of this character are reported, nor is it expected that there will be a resumption of buying until the question of Rail specifications, quality and price, is adjusted. A purchase of Traction Rails by an established line, amounting to 1500 tons, is reported. Spikes are easier and quotations are revised to represent a decline of 10c. per 100 lb. We quote as follows: Angle Bars, accompanying Rail orders, 1907 delivery, 1.65c.; car lots, 1.90c. to 1.95c.; Spikes, 2.25c. to 2.35c., according to delivery; Track Bolts, 2.65c. to 2.75c., base. Square Nuts, and 2.80c. to 2.90c., base. Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 30 to 45 lb. sections, \$35; 25-lb., \$36; 20-lb., \$37; 16-lb., \$38; 12-lb., \$39, f.o.b. mill. Standard Sections, \$28, f.o.b. mill, full freight to destination.

**Structural Material.**—The deals of notable size that have appeared in the market since last report are mostly of Western origin. Figures are asked on 1100 tons for a building to be erected at Seattle, Wash.; also on 1100 tons for the Ainsworth Building, Portland, Ore., and for the Arlington Building, Minneapolis, Minn., 1000 tons will be required. Notwithstanding there is still a large amount of tonnage offered for figures, competition is exceedingly keen and has resulted in prices not always satisfactory in point of profit. There has been a marked falling off in building structure business, but highway and railroad bridges are supplying a fair amount of tonnage. Specifications seem still to be plentiful enough to keep the mills fully engaged. Prices from store are quoted without change, at 2.05c. to 2.10c., and mill prices, at Chicago, are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.88c.; Angles, 3 to 6 in., 1/4-in. and heavier, 1.88c.; larger than 6 in. on one or both legs, 1.98c.; Beams, larger than 15 in., 1.98c.; Zees, 3 in. and over, 1.88c.; Tees, 3 in. and over, 1.93c., in addition to the usual extras for cutting to extra lengths, punching, coping, bending and other shop work.

**Plates.**—The only specific tonnage reported in Plates is an order taken by the leading interest for 6000 tons. Specifications on contracts are of sufficient volume to keep all Plate mills busy for the remainder of the year in any event. The situation as to deliveries has changed but little; delays

are still extended. Warehouse stocks are to a larger extent relied upon for immediate wants. We quote for future delivery as follows: Tank Plates, 1/4-in. and heavier, wider than 6 1/2 and up to 100 in. wide, inclusive, car lots, Chicago, 1.88c. to 2.08c.; 3-16 in., 1.98c. to 2.18c.; Nos. 7 and 8 gauge, 2.03c. to 2.23c.; No. 9, 2.13c. to 2.33c.; Flange quality, in widths up to 100 in., 1.98c. to 2.08c., base, for 1/4-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.98c. to 2.18c.; Flange quality, 2.08c. Store prices on Plates are as follows: Tank Plates, 1/4-in. and heavier, up to 72 in. wide, 2.20c. to 2.30c.; from 72 to 96 in. wide, 2.30c. to 2.40c.; 3-16 in., up to 60 in. wide, 2.30c. to 2.40c.; 72 in. wide, 2.50c. to 2.65c.; No. 8, up to 60 in. wide, 2.35c. to 2.45c.; Flange and Head quality, 0.25c. extra.

**Sheets.**—From the fact that improvement in deliveries is exceedingly slow, it is evident that there must be a good deal of new business coming forward. Independent mills are nearer making normal shipments than the leading interest; from the former sources orders are executed in about four weeks on Black and eight on Galvanized, while from the latter there is little improvement. Store stocks are pretty well supplied with Black Sheets, but are still short in certain sizes of Galvanized. We quote mill shipments as follows, Chicago: Blue Annealed, No. 10, 2.03c.; No. 12, 2.08c.; No. 14, 2.13c.; No. 16, 2.23c.; Box Annealed, Nos. 17 to 21, 2.53c.; Nos. 22 to 24, 2.58c.; Nos. 25 to 26, 2.63c.; No. 27, 2.68c.; No. 28, 2.78c.; No. 29, 2.88c.; No. 30, 2.98c.; Galvanized Sheets, Nos. 10 to 14, 2.83c.; Nos. 15 and 16, 3.03c.; Nos. 17 to 21, 3.18c.; Nos. 22 to 24, 3.33c.; Nos. 25 and 26, 3.53c.; No. 27, 3.73c.; No. 28, 3.93c.; No. 30, 4.43c. Sheets from store: Blue Annealed, No. 10, 2.50c.; No. 12, 2.55c.; No. 14, 2.60c.; No. 16, 2.70c.; Box Annealed, Nos. 18 to 21, 2.80c.; Nos. 22 to 24, 2.85c.; No. 26, 2.90c.; No. 27, 2.95c.; No. 28, 3.05c.; No. 30, 3.45c.; Galvanized from store: Nos. 10 to 20, 3.30c. to 3.35c.; Nos. 22 to 24, 3.55c. to 3.60c.; No. 26, 3.65c. to 3.70c.; No. 27, 3.85c. to 3.95c.; No. 28, 4.15c.; No. 30, 4.65c. to 4.70c.

**Bars.**—The heavy buying of Bars extending over the past several weeks has provided for the bulk of known requirements. The amount of tonnage placed has been very large. It is estimated that the minimum contract tonnage of the implement interests exceeds that placed last year by one-fifth. While no large orders are in evidence this week, there has been considerable business done in scattering orders for small lots. Quotations, Chicago, are as follows: Steel Bars, 1.78c., with half extras; Iron Bars, 1.78c.; Hoops, 2.18c., extras as per Hoop card; Bands, 1.78c., as per Bar card, half extras; Soft Steel Angles and Shapes, 1.88c., half extras. Store prices are as follows: Bar Iron, 2.10c. to 2.25c.; Steel Bars, 2c. to 2.10c.; Steel Bands, 2c., as per Bar card, half extras; Soft Steel Hoops, 2.35c. to 2.45c., full extras.

**Merchant Pipe.**—A continued demand for Merchant Pipe, affecting all sizes, but particularly heavy in the smaller sizes, is still reported. Consumers are obliged to anticipate their wants far in advance, as no appreciable gain is yet apparent in deliveries. The following mill discounts are quoted: Black Pipe, 3/4 to 6 in., 71.2; 7 to 12 in., 68.2; Galvanized, 3/4 to 6 in., 61.2. These discounts are subject to 1 point on the base. From store in small lots, Chicago jobbers quote 68 per cent. on Black Steel Pipe, 3/4 to 6 in. About 4 points advance above these prices is asked for Iron Pipe.

**Boiler Tubes.**—While in most other departments of finished material there is an easier movement in the development of new business, Tubular Goods are not so affected. Orders from both railroad and industrial boiler shops are plentiful, and the pressure for deliveries is unabated. Mill quotations for future delivery on base sizes are as follows: 2 1/2 to 5 in., in carload lots, Steel Tubes, 63.2; Iron, 50.2; Seamless, 49.2; 2 1/2 in. and smaller, and lengths over 18 ft.; and 2 1/2 in. and larger and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1 1/2 in.....	35	35	35
1 1/2 to 2 1/2 in.....	50	35	35
2 1/2 in.....	52 1/2	35	35
2 1/2 to 3 in.....	60	47 1/2	47 1/2
3 in. and larger.....	50	35	..

**Merchant Steel.**—A greater part of season requirements has been contracted for by the various interests using Steel Shapes and Finished Bars. Trade in these lines shares the present summer inactivity noticed elsewhere. Quotations are as follows: Planished or Smooth Finished Tire Steel, 1.98c.; Iron Finish, up to 1 1/2 x 1/2 in., 1.93c.; Iron Finish, 1 1/2 x 1/2 in. and larger, 1.78c., base; Channels for solid Rubber Tires, 3/4 to 1 in., 2.28c., and 1 1/4 in. and larger, 2.18c.; Smooth Finished Machinery Steel, 2.18c.; Flat Sleigh Shoe, 1.93c.; Concave and Convex Sleigh Shoe, 2.08c.; Cutter Shoe, 2.46 1/2c.; Toe Calk Steel, 2.33c.; Railroad Spring, 1.98c.; Crucible Tool Steel, 7/4c. to 8c., and still higher prices are asked on special grades. Shafting, 50 per cent. off in car lots, and 45 per cent. in less than car lots, base territory.

**Cast Iron Pipe.**—The last week's business was comprised of small orders, in which were included a number of



unimportant lettings running from 200 to 500 tons. The aggregate tonnage involved was, however, large enough to make a satisfactory showing for this dull season. No lettings of note save that of Columbus, Ohio, 2500 tons, which, as previously reported, will be let on the 10th, are in sight. We quote, per net ton, Chicago, as follows: Water Pipe, 4-in., \$38 to \$39; 6 to 12 in., \$37 to \$38; 16-in. and up, \$36 to \$37, with \$1 extra for Gas Pipe.

**Coke.**—A large supply and a not overly heavy demand are the chief features in Coke. Prices on 72-hr. Connellsville Coke remain at about \$3.15 to \$3.25 at ovens for forward delivery.

**Old Material.**—On the recent break in prices the rolling mills were heavy buyers. A large amount of tonnage was taken by these interests, with the result that they are now pretty well supplied and are only buying bargain offers. Though the general tendency is toward a still further softening in prices, they have, through the week just ended, held fairly well. Melting Steel is a shade lower, as are Dealers' Forge, Bushelings and Turnings. The absorbent powers of the market will be severely taxed this week by the heavy tonnage of railroad Scrap to be placed. Of the 13,400 tons included in these lists, 5600 tons is offered to-day, while the Baltimore & Ohio list comes out on the 10th. The lists are as follows: Santa Fé, 2500 tons; Missouri Pacific, 500 tons; Rock Island, 2600 tons; Baltimore & Ohio, 7800 tons.

Old Iron Rails.....	\$24.50 to \$25.00
Old Steel Rails, rerolling.....	18.25 to 18.75
Old Steel Rails, less than 3 ft.....	18.00 to 19.00
Relaying Rails, standard sections, subject to inspection.....	28.00 to 30.00
Old Car Wheels.....	24.50 to 25.00
Heavy Melting Steel Scrap.....	16.50 to 17.00
Frogs, Switches and Guards, cut apart.....	17.50 to 18.00
Mixed Steel.....	12.50 to 13.00

The following quotations are per net ton:

Iron Fish Plates.....	\$18.50 to \$19.50
Iron Car Axles.....	26.00 to 26.50
Steel Car Axles.....	21.00 to 21.50
No. 1 Railroad Wrought.....	15.25 to 15.75
No. 2 Railroad Wrought.....	14.25 to 14.75
Railway Springs.....	16.00 to 16.50
Locomotive Tires, smooth.....	17.50 to 18.00
No. 1 Dealers' Forge.....	13.00 to 13.50
Mixed Busheling.....	11.50 to 12.00
Iron Axle Turnings.....	11.75 to 12.25
Soft Steel Axle Turnings.....	11.75 to 12.25
Machine Shop Turnings.....	11.75 to 12.25
Cast Borings.....	10.00 to 10.50
Mixed Borings, &c.....	10.00 to 10.50
No. 1 Mill.....	10.00 to 10.50
No. 2 Mill.....	9.00 to 9.50
No. 1 Bollers, cut to Sheets and Rings.....	11.50 to 12.00
No. 1 Cast Scrap.....	19.00 to 19.50
Stove Plate and Light Cast Scrap.....	15.25 to 15.75
Railroad Malleable.....	17.00 to 17.50
Agricultural Malleable.....	15.50 to 16.00
Pipe and Flues.....	12.50 to 13.00

**Metals.**—Though there has been no improvement in demand and trade is extremely quiet, no further recession in prices is reported. The general attitude of both buyers and sellers is one of waiting for developments. Conditions governing the movement of Old Materials are much the same as those observed in New Metals. We quote as follows: Casting Copper, 23½c. to 24c.; Lake, 25c. to 25½c., in car lots for prompt shipment; small lots, ¼c. to ¾c. higher; Pig Tin, car lots, 44c.; small lots, 44½c.; Lead, Desilverized, 6.05c. to 6.15c., for 50-ton lots; Corroding, 7c. to 7.10c., for 50-ton lots; in car lots, 2¼c. per 100 lb. higher; Spelter, 6.87½c.; Cookson's Antimony, 22½c., and other grades, 21c. to 21½c.; Sheet Zinc is \$8.60 list, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 20c.; Heavy Copper Wire, 19½c.; Copper Bottoms, 17c.; Copper Clips, 18c.; Red Brass, 17½c.; Red Brass Borings, 15c.; Yellow Brass, 14½c.; Yellow Brass Borings, 13c.; Light Brass, 11c.; Lead Pipe, 5c. Tea Lead, 4.65c.; Zinc, 5c.; Pewter, No. 1, 30c.; Tin Foil, 35c.; Block Tin Pipe, 40c.

## Cleveland.

CLEVELAND, OHIO, July 9, 1907.

The movement of Ore from the upper lake ports continues unusually heavy and it is probable that the new record of tonnage that was established in June will be equaled, and very likely slightly exceeded, during July. Complete reports from the docks show that the Ore fleet carried 6,433,369 gross tons of Ore from the Lake Superior District during June. The largest previous month was July, 1906, when the Ore movement from the upper lakes was 5,762,772 tons, the net gain over the previous record breaking month being 670,597 tons. The June shipments make the total movement 12,685,630 tons up to July 1, which is a gain of 1,444,034 tons over the same period last year. Duluth, with 4,094,046 tons, leads all the other ports in shipments up to July 1, and Two Harbors, Superior and Escanaba follow in the order named. Shippers are confident that with the record established in June the total Ore movement this year will exceed 40,000,000 tons. There is plenty of business for all the boats and the shippers are well supplied with contract tonnage, so that little wild tonnage is being offered. The boats

are getting good dispatch, and with a better stage of water in the rivers the big freighters are carrying heavier cargoes than they were a month ago. The car situation has improved and there is little complaint of a shortage at the present time. Much Ore is still being taken from the stock piles at the upper lake ports. Reports from the Ore ranges indicate that there is a scarcity of labor at the mines, and this scarcity is expected to increase during the next few weeks. There are some inquiries for Ore, and a few sales of small lots have been made during the week. Ore prices remain firm, being as follows at Lake Erie docks, per gross ton: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range Non-Bessemer, \$4.25; Mesaba Non-Bessemer, \$4; Siliceous Bessemer, \$2.75; Siliceous Non-Bessemer, \$2.35 to \$2.60.

**Pig Iron.**—The market is very quiet and prices are slightly weaker, in spite of the efforts of some furnaces to hold quotations as high as they were a few weeks ago. The only sales during the week have been a few small lots for spot, third and fourth quarter, and first quarter of 1908 deliveries. There is practically no demand for spot Foundry Iron, and with a number of the foundries shut down for inventories the demand is not expected to be renewed during the present month. The furnaces are so well sold up, however, that the supply of spot Iron or Iron for delivery during the remainder of the year is very limited. While some furnaces are still asking \$24 for No. 2 Foundry Iron for spot delivery, purchases can be made at \$23.50 at furnace. The same Iron is held at \$23 to \$23.50 for third quarter delivery, and for last quarter delivery No. 2 Northern Foundry Iron is quoted at \$22.50 to \$23, Valley furnace. One sale is reported at the former figure, but about \$22.75 at furnace is regarded as the market price at present. One interest reports sales of No. 2 Foundry Iron for last half delivery at \$23.50 at western New York furnace. Furnaces that made sales a few weeks ago of No. 2 Foundry Iron at \$22 at furnace for the first quarter of 1908 delivery report that they would be glad to get \$21.50 at furnace for the same Iron now. No quotations are being made lower than \$21.50, however. With the easing up of the situation, foundries are disposed to defer making contracts to cover for their first quarter and first half of 1908 requirements, and a buying movement of any consequence for the first part of next year deliveries is not expected before September. Quotations for the fourth quarter of 1907, f.o.b. Cleveland, are as follows:

Bessemer.....	\$23.90
Northern Foundry, No. 1.....	\$23.90 to 24.40
Northern Foundry, No. 2.....	23.40 to 23.90
Northern Foundry, No. 3.....	22.90 to 23.40
Gray Forge.....	22.50

**Coke.**—No sales are reported. There are no indications of stronger prices. For last half delivery we quote Foundry Coke at \$3 to \$3.25, at oven. For spot shipment purchases can readily be made at the former price. One interest is still holding at \$3.50.

**Finished Iron and Steel.**—The past week has been quiet, both as regards new business and specifications on contracts. Practically all the large consumers have covered for the balance of the year, and the falling off in the amount of new business causes no surprise and is not regarded as unusual for this time of the year, and the general situation is regarded as satisfactory. A few good sized contracts have been closed during the week. One leading interest closed contracts for over 2000 tons of Steel Bars and about 6000 tons of Structural Shapes and Plates, a large part of the latter to be used in the construction of a lake boat. Another mill reports the sale of 1000 tons of Shapes and Plates for last half delivery. The American Shipbuilding Company is figuring on contracts for two or three more big freighters and the contracts may be closed soon. Specifications are coming in in fairly good shape on Structural contracts and the mills are well filled with work. Warehouses report a large decrease in the demand for material out of stock, and mills that have been doing a good premium business in Plates and other Finished Materials during the past few months report an absence of a demand at premium prices. While the situation has eased up all round, not much improvement in deliveries is noted yet, this being partly due to the large number of specifications on old contracts that came in during the last week of June. While nearly every consumer specified to the full amount of his contract, there were a few cases in which contracts were canceled which called for material at lower prices than those now prevailing. All prices remain firm. Steel Bars are quoted at 1.80c., Cleveland, for carload lots. We quote Iron Bars at 1.75c. to 1.80c., Cleveland, for carload lots, with half extras, the lower price being for good orders. We quote Plates, ¼-in. and heavier, carload lots, 1.80c., base, Cleveland. Beams and Channels, carload lots, are quoted at 1.80c., Cleveland. Steel Bars are selling at 1.95c., out of stock, and Iron Bars at 2c. Warehouse prices on Sheets are as follows: Blue Annealed, No. 10, 2.30c.; No. 28, One Pass Cold Rolled, 3.05c.; No. 28 Galvanized, 4.05c. The stock price on Boiler Tubes, 2¼ to 5 in., is 64 per cent. discount, and on Black Merchant Iron Pipe, base sizes, 67 per cent. discount.

**Old Material.**—The market is very quiet, and prices show a tendency to become weaker. The temporary shut

down of many mills has cut off the demand, and only an occasional sale of a carload lot is being made. The general dullness has affected the Cast Scrap market, and the demand from foundries for Cast Scrap, which had been good for some time, has about disappeared, while prices are a shade weaker. The railroad offerings so far this month are very light. Dealers' prices to the trade, per gross ton, f.o.b. Cleveland, are as follows:

Old Steel Rails.....	\$16.50 to \$16.75
Old Iron Rails.....	24.00 to 25.00
Steel Car Axles.....	21.50 to 22.00
Old Car Wheels.....	23.00 to 23.50
Relaying Rails, 50 lb. and over.....	29.00 to 31.00
Relaying Rails, under 50 lb.....	31.00 to 32.50
Heavy Melting Steel.....	16.00 to 16.50
Railroad Malleable.....	18.75 to 19.25
Agricultural Malleable.....	15.50
Light Bundled Sheet Scrap.....	14.50 to 15.00

The following quotations are per net ton, f.o.b. Cleveland:

Iron Car Axles.....	\$26.00 to \$27.00
Cast Borings.....	10.25 to 10.75
Iron and Steel Turnings and Drillings.....	12.50 to 13.00
No. 1 Busheling.....	14.50 to 15.00
No. 1 Railroad Wrought.....	16.00 to 16.50
No. 1 Cast.....	19.00 to 19.50
Stove Plate.....	15.00 to 15.50
Bundled Tin Scrap.....	15.00 to 16.00

## Pittsburgh.

PARK BUILDING, July 10, 1907.—(By Telegraph.)

**Pig Iron.**—The market is extremely dull. Fully two-thirds of the Pig Iron sellers in Pittsburgh have found it convenient to go on vacations. The tone is slightly weaker in Bessemer, Foundry and Forge grades. A sale of 150 tons of prompt Bessemer was made at \$23.25, Valley furnace. A sale of 1000 tons for July and August delivery was made at \$23, f.o.b. southern Ohio furnace, to a Western consumer. On fair sized lots of Bessemer for third quarter delivery we quote \$23, Valley furnace. Small prompt lots would command \$23.25. The 10,000 tons of Milliken Basic for July to October delivery, held by middlemen, has been taken out of the market, it being understood that a furnace interest takes it, giving in exchange Bessemer for later delivery. The Basic situation is thus much improved. Foundry Iron is extremely dull, and some furnaces are piling Iron, which may easily be worked off later. In the absence of important sales we continue to quote \$23, Valley furnace, for third, and \$22.50 for fourth quarter. Forge is easier, furnaces quoting \$22, Valley furnace, for July, August or entire second half. Low Phosphorus is quiet, one large buyer having withdrawn an inquiry for second half.

**Steel.**—The Billet market has become quiet. One recent prominent seller has withdrawn from the market for third quarter. We quote Bessemer Billets, nominal, at \$30, Pittsburgh. Open Hearth Billets are being offered at \$32 to \$33, Pittsburgh. Sheet Bars are \$31, f.o.b. Pittsburgh. Two carloads of Milliken Open Hearth Billets are en route Pittsburgh, and were offered everywhere yesterday at \$32, Pittsburgh, without finding a buyer. Forging Billets are quoted at \$34, Pittsburgh, and this should have been the price for last week.

(By Mail.)

The market has become still more dull as regards new transactions, but pressure on the mills for deliveries is as heavy as ever, and in some lines appears to have increased. To meet the heavy demand on some of its allied finishing interests, particularly the Wire mills, the Carnegie Steel Company has decided to operate its Ohio Works at Youngstown exclusively on Billets during the present quarter. For the first half of the year this mill alternated between Rails and Sheet Bars, outside of the tonnage of Billets which is regularly made. This change, with the closing of some finishing mills for repairs, while nearly all the Steel mills are kept continuously in operation, should somewhat relieve the situation, but thus far the pressure for crude Steel is as heavy as ever. The pressure for Wire and Pipe products is as strong as at any time, while there is a larger demand for Plates and Shapes. Raw materials show no important change. The 10,000 tons of Basic Pig Iron at an Ohio Valley furnace, for delivery July to October, inclusive, which was released through the Milliken failure and has been hanging over the market, has been disposed of through a couple of trade deals, and this market has now seen the last of the Milliken Iron. Bessemer Pig, while scarce and strong, has been inactive, and the Foundry Iron market appears to show a somewhat easier tone. Coke is scarcely as strong as last week, but is firm, while Scrap is dull and inclined to weakness.

**Ferromanganese.**—The market has shown no particular

change, being quiet and lower than a fortnight ago. We quote fourth quarter at \$60 to \$61, delivered, Pittsburgh, and July and August at \$62 to \$63.

**Muck Bar.**—There is hardly any material to be had, but there is little inquiry. We quote prices unchanged at \$37 to \$38, delivered, Pittsburgh, for all Pig Muck.

**Skelp.**—Pressure on mills for deliveries continues heavy, but there is little new business being done. We quote for forward delivery: Grooved Steel Skelp, 1.90c. to 1.95c.; Sheared Steel Skelp, 1.90c. to 2c.; Grooved Iron Skelp, 2.20c. to 2.25c., and Sheared Iron Skelp, 2.30c. to 2.35c., these prices being f.o.b. maker's mill.

**Rods.**—It is hardly as difficult to buy Rods as it was a fortnight ago, but prices are unchanged, and we quote \$36.50 to \$37, Pittsburgh, for Bessemer, and \$37.50 to \$38 for Open Hearth.

**Steel Rails.**—In the past 60 days the local Rail interest has sold 100,000 tons of Standard Rails, largely for delivery over the balance of this year. Its sales the past two weeks have been rather light. Inquiries for 20,000 tons of Rails were received last week, and this is likely to result in a fair volume of business this week. The Ohio Works, at Youngstown, have been taken off Rails and Sheet Bars for the present quarter and will make Billets exclusively. Rail production at this plant during the first half of the year was not very heavy, as a large tonnage of Billets has been made right along, and the balance of the Steel was turned into Rails and Sheet Bars alternately. The Edgar Thomson plant, which makes about 75,000 tons of Rails per month, will be kept in full operation through this year, as already there is more than enough tonnage booked to keep it going to the end of the year. A fair tonnage has been booked for next year's delivery, but this business is slow, partly because some of the railroads are waiting until the matter of specifications is cleared up, and partly because the Western mill still has considerable unsold tonnage for next year. A number of roads have made reservations with the local mill, and these will be turned into orders in regular course when the matter of specifications is settled. About 1500 tons of Light Rails were sold by the local interest the past week, this market being strong and active. We quote Light Rails as follows: \$33 to \$34 for 20 to 45 lb.; \$34 to \$35 for 16-lb., and \$35 to \$36 for 12-lb., at mill. Angle Splice Bars are held at 1.65c., and Standard Section Rails at \$28, at mill.

**Plates.**—Specifications on Plate contracts have improved somewhat. The railroads have held their semiannual meetings, and this is expected to result in a good crop of Steel car orders in due course. This week, however, no car business of importance is being figured on. We quote: Tank Plates, ¼-in. thick, 6¼ in. up to 100 in. wide, 1.70c. to 1.80c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than ¼-in. to and including 3-16-in.	
Plates on thin edges.....	\$0.10
Gauges Nos. 7 and 8.....	.15
Gauge No. 9.....	.25
Plates over 100 to 110 in.....	.05
Plates over 110 to 115 in.....	.10
Plates over 115 to 120 in.....	.15
Plates over 120 to 125 in.....	.25
Plates over 125 to 130 in.....	.50
Plates over 130 in.....	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.).....	.10
Complete Circles.....	.20
Boiler and Flange Steel Plates.....	.10
"A. B. M. A." and ordinary Firebox Steel Plates.....	.20
Still Bottom Steel.....	.30
Marine Steel.....	.40
Shell Grade of Steel is abandoned.	

**TERMS.**—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within 10 days from date thereof, discount of ¼ of 1 per cent. is allowable. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

**Structural Material.**—There are no large contracts being figured on, but business going to mills is of better volume. The closing of a couple of Structural plants in the East has put a burden upon the other mills, and they are now in receipt of all the business they can handle and make reasonable deliveries. We quote: Beams and Channels, up to 15 in., 1.70c.; over 15 in., 1.80c.; Angles, 3 x 2 x ¼ in. thick up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3½ in., 1.80c.; Zees, 3 in. and larger, 1.70c.; Tees, 3 in. and larger, 1.75c. Under the Steel Bar card Angles, Channels and Tees under 3 in. are 1.70c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

**Sheets.**—Production has been rather light, on account of mills being off for much needed repairs. Some of the mills idle last week were started this week, but other mills have been taken off. The mills are not as far behind in deliveries of Black Sheets as they were, but are still far behind in Galvanized and in Blue Annealed and some other specialties. On Black they can promise deliveries in from six to eight weeks, while on Galvanized fully twice as long



a time is asked. Nothing has come of the recent reports that there would be an advance in Galvanized, and with the much weaker tone in the Spelter market it does not seem probable that any change in prices will be made, albeit the mills are far behind in deliveries. We quote: Blue Annealed Sheets, No. 10 gauge and heavier, 1.85c.; Nos. 11 and 12, 1.90c.; Nos. 13 and 14, 1.95c.; Nos. 15 and 16, 2.05c.; Box Annealed, Nos. 17 to 21, 2.35c.; Nos. 22 to 24, 2.40c.; Nos. 25 and 26, 2.45c.; No. 27, 2.50c.; No. 28, 2.60c.; No. 29, 2.75c.; No. 30, 2.85c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.65c.; Nos. 12 and 14, 2.75c.; Nos. 15 and 16, 2.85c.; Nos. 17 to 21, 3c.; Nos. 22 and 24, 3.15c.; Nos. 25 and 26, 3.35c.; No. 27, 3.55c.; No. 28, 3.75c.; No. 29, 4c., and No. 30, 4.25c. We quote No. 28 gauge Painted Roofing Sheets at \$1.85 per square, and Galvanized Roofing Sheets, No. 28 gauge, \$3.25 per square, for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances.

**Hoops and Bands.**—The market is less active as regards contracts, but specifications are excellent and mills are still behind in deliveries. We quote regular mill prices unchanged as follows: Steel Hoops, 2c., and Bands for all purposes at 1.60c., base, half extras, as per Standard Steel card. These prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery, an advance of \$2 a ton being charged for less than carloads.

**Tin Plate.**—Spot demand is not heavy, but prospects for a continued large demand against contracts have further improved. The mills have scarcely any stocks on hand and no full lines. We quote for third and fourth quarter delivery as follows: \$3.90 for 100-lb. Cokes, f.o.b. Pittsburgh, for 14 x 20 100-lb. Cokes, terms 30 days, less 2 per cent. off for cash in 10 days, on which price a rebate of 5c. a box is allowed for carload and larger lots.

**Bars.**—The demand for both Iron and Steel Bars is only moderately active. In Steel Bars the mills are well sold up for this year, while in Iron Bars they are sold for a fair distance ahead. Nearly all the Iron mills are closed for repairs. The conference between the Amalgamated Association and the Republic Iron & Steel Company was in session all day to-day (Tuesday) without reaching an agreement, but another session will be held Wednesday, which is the last day in which the scale matter can be settled by conference, as after the 10th the matter must go to conciliation. As stated in last report, it is hardly likely that the parties will desire this outcome, and the prospects are that they will reach an agreement at the conference Wednesday, which agreement, of course, is more likely to be an adoption of the old scale than anything else. We quote Steel Bars at 1.60c., Pittsburgh, and Iron Bars on desirable orders at 1.70c., delivered, Pittsburgh, while ordinary lots go at 1.75c., delivered, Pittsburgh.

**Spelter.**—The market has been growing steadily weaker and prompt carloads can now be done at 6.25c., delivered, Pittsburgh, a drop of 17½c. per 100 lb. in the week. The market is decidedly quiet, but part of the decline is attributed to the unexpected and large cut of ½c. a pound made by the Lead interest, Spelter and Lead generally showing some sympathy with each other.

**Merchant Steel.**—The market is rather quiet. We quote: Smooth Finished Machinery Steel, 1.85c. to 2c., depending on quality; Flat Sleigh Shoe, 1.65c. to 1.75c.; Cutter Shoe, 2.15c. to 2.20c.; Toe Calk Steel, 2.10c. to 2.15c.; Railroad Spring Steel, 1.75c. to 1.80c.; Crucible Tool Steel, 6c. to 8c., for ordinary grades, and 10c. and upward for special grades. We quote Cold Rolled Shafting at 50 per cent. off in carloads, and 45 per cent. in less than carloads, delivered in base territory.

**Railroad Spikes.**—Producers are well sold up. The market on standard sizes is strong, but not very active, as the railroads have not been placing very large Rail orders of late, and generally make their heavy purchases of Spikes at the same time that they buy Rails. We quote Standard Spikes at \$2.20, but occasionally one or two producers will do \$2.15 on a very desirable order. In small sizes the market is recovering from the disturbance of a producer taking on considerable business at cut prices, and the quotations given last week, \$2.40 to \$2.50, are being well adhered to.

**Merchant Pipe.**—The demand for Merchant Pipe continues excellent and mills are sold uncomfortably far ahead. Line Pipe is quieter, most of the mills being well filled up for the season, while most of the important contracts have been closed. Discounts on Steel Pipe are as follows:

Merchant Pipe.	Jobbers, carloads.	
	Black.	Galv.
1½ to ¼ in.	65	49
¾ in.	67	53
1 in.	69	57
¾ to 6 in.	73	63
7 to 12 in.	70	55
Extra strong, plain ends:		
1½ to ¾ in.	58	46
1½ to 4 in.	65	53
4½ to 8 in.	61	49
Double extra strong, plain ends:		
1½ to 8 in.	54	43

All above discounts are subject to 1 point on the base and 5 per cent. on the net.

Official discounts on Iron Pipe, which are shaded one-half point or more to the large trade, are as follows, f.o.b. Pittsburgh:

Standard Genuine Iron Pipe.	Black.		Galv.	
	Black.		Galv.	
¾ to 6 in.	61	57	61	57
1 in.	62	58	62	58
1½ in.	60	42	60	42
2 in.	58	42	58	42
2½ and 3 in.	62	47	62	47
7 to 12 in.	62	47	62	47
Extra Heavy Iron Pipe, Plain Ends.				
1½, 2 and 3 in.	62	40	62	40
3½ to 4 in.	59	47	59	47
4½ to 8 in.	55	42	55	42

**Iron and Steel Scrap.**—The market is very dull and inclined to weakness. The rolling mills are buying scarcely anything, while the foundries are buying much less Cast Scrap, &c., for prompt delivery, as they are getting better deliveries of Pig Iron. Regular prices for No. 1 Cast Scrap are unchanged, at \$21 to \$21.50, but it is no longer the case that a dealer able to make immediate delivery of a good lot can exact a premium. Heavy Melting Stock is particularly dull. One consumer in Pittsburgh, who takes a particularly careful selection, bought a few hundred tons, paying \$18.65. The market, however, is not over \$18.50 at the outside, and the best bid of dealers is generally \$18. We quote prices not overly strong, as follows: Heavy Steel Scrap, \$18 to \$18.50, for Pittsburgh, Steubenville and Sharon delivery, prices depending on quality; No. 1 Railroad Wrought Scrap, \$18.50 to \$18.75, and No. 2, \$18 to \$18.25; Bundled Sheet Scrap, \$16.75; No. 1 Busheling Scrap, \$18 to \$18.25; No. 2 Busheling Scrap, \$15 to \$15.25; Old Steel Rails, short pieces, for Open Hearth purposes, \$18.25 to \$18.50; Old Steel Rails, rerollers, \$20; Low Phosphorus Melting Stock, \$22.50 to \$23; Cast Iron Borings, \$13.75 to \$14; Stove Plate, \$16.50 to \$16.75; Old Car Wheels, \$26 to \$26.25; Steel Axles, \$21.75 to \$22; Grate Bars, \$16.25 to \$16.50; No. 1 Cast Scrap, \$21 to \$21.50; all above prices are per gross ton, f.o.b. Pittsburgh.

**Boiler Tubes.**—The market is fairly active, with prices strong and premiums occasionally paid for prompt shipment. We quote:

Boiler Tubes.	Iron.		Steel.	
	Iron.		Steel.	
1 to 1½ in.	42	47	42	47
1½ to 2½ in.	42	59	42	59
2½ in.	47	61	47	61
2½ to 3 in.	52	65	52	65
3 to 13 in.	42	59	42	59
2½ in. and smaller, over 18 ft. long, 10 per cent. net extra.				
2½ in. and larger, over 22 ft. long, 10 per cent. net extra.				

**Coke.**—The market is hardly as firm as last week, but is still considerably stronger than it was a month ago. The contract market has been much quieter than ordinarily at this time of year. More furnaces than usual contracted for the entire year, instead of taking only the first half, and in a number of instances where contracts expired July 1 the furnaces have concluded to buy from time to time, although they may wind up by making contracts for the fourth quarter. Quite a number of new ovens are being built, especially in the Klondike District of the Connells-ville region, and while many were expected to come in about this time, the bad weather earlier in the year delayed construction to such an extent that they will not be in before September or October. We quote Standard Connells-ville Furnace Coke at \$2.40 to \$2.50 at oven for prompt shipment, while contracts are \$2.50 to \$2.65, the higher price being only in the case of Coke of a particularly good analysis. Standard Connells-ville 72-hr. Foundry Coke is pretty firm at \$3 to \$3.25 at oven for either spot or contract.

## Cincinnati.

FIFTH AND MAIN STS., July 10, 1907.—(By Telegraph.)

**Pig Iron.**—The lull in the market continues to be as marked as a week since. Actual transactions have been small and of no special importance. Those consumers who have not fully covered for third quarter requirements are evidently satisfied to let well enough alone and wait such developments as the future may bring forth. In the interval they are pursuing a hand to mouth policy, merely buying enough to tide them over the next month or two, trusting that by that time prices will have found a lower level, or at least be sufficiently well outlined as to inspire confidence in the outcome. At the same time, it is apparent that the furnaces are making no special efforts to force matters, but are well satisfied to maintain the record of the past month or two in forwarding practically all of the current make, leaving very little to give to the late comers. The premium on spot Iron has practically disappeared, and prices for nearby and third quarter delivery are virtually on a parity, or \$20.50 to \$21, Birmingham. Fourth quarter demand has been so light that prices are well nigh unobtainable, \$19.50 to \$20 being leading quotations. High Silicon Irons are said to be in fair demand, but no sales are recorded of any considerable



tonnage. There have been several small inquiries for Gray Forge, but as a general proposition there is little activity in the lower grades. Aside from an inquiry for 500 or 600 tons from an Eastern concern and an indefinite tonnage desired by a melter in Indiana, there is none reported from this territory. Freight rates from Hanging Rock District to Cincinnati are \$1.15, and from Birmingham, \$3.25. We quote for July delivery, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1.....	\$24.25 to \$24.75
Southern Coke, No. 2.....	23.75 to 24.25
Southern Coke, No. 3.....	23.25 to 23.75
Southern Coke, No. 4.....	22.50 to 23.00
Southern Coke, No. 1 Soft.....	24.25 to 24.75
Southern Coke, No. 2 Soft.....	23.75 to 24.25
Southern Coke, Gray Forge.....	21.25 to 21.75
Southern Coke, Mottled.....	20.25 to 20.75
Ohio Silvery, 8 per cent. Silicon.....	30.15 to 30.65
Lake Superior Coke, No. 1.....	24.15 to 24.65
Lake Superior Coke, No. 2.....	23.65 to 24.15
Lake Superior Coke, No. 3.....	23.15 to 23.65

#### Car Wheel Irons.

Standard Southern Car Wheels.....	\$29.00 to \$29.50
Lake Superior Car Wheels.....	27.50 to 28.00

**Coke.**—A large percentage of melters have contracted for the year's supply, yet new business is being booked each week of considerable tonnage. Prices are firm and well maintained. We quote best brands of Connellsville and Virginia Foundry at \$3 to \$3.25, f.o.b. ovens.

**Finished Iron and Steel.**—Specifications on current contracts have not been as heavy during the past week. Deliveries continue quite slow and Structural mills are making only fairly good shipments. Plate mills are getting somewhat filled up and deliveries are not very prompt, quoting 30 days on Universal Plates and from four to six weeks on Sheared Plates. Structural mills have opened their books for the first half of 1908, but so far no considerable sales have been reported. We quote, f.o.b. Cincinnati, as follows: Iron Bars, carload lots, 1.80c., with half extras; small lots from store, 2c., with full extras. Steel Bars, carload lots, 1.75c., half extras; smaller lots from store, 1.95c., with full extras. Base Angles, carload lots, 1.85c. Beams and Channels, carload lots, 1.85c., base. Plates, ¼-in. and heavier, carload lots, 1.85c., base, and smaller lots from store, 2.25c. Sheets No. 16, carload lots, 2.05c., and smaller lots from store, 2.00c.; No. 14, carload lots, 1.95c., and smaller lots from store, 2.50c. Steel Tire, 1 x ¼ in. or heavier, 1.95c., in carload lots.

**Old Material.**—A fair sprinkling of sales is reported. We quote dealers' prices, f.o.b. Cincinnati, about as follows:

No. 1 R. R. Wrought, net ton.....	\$17.00 to \$17.50
Cast Borings, net ton.....	9.50 to 10.00
Steel Turnings, net ton.....	12.50 to 13.00
No. 1 Cast Scrap, net ton.....	18.00 to 18.50
Old Iron Axes, net ton.....	26.00 to 26.50
Old Iron Rails, gross ton.....	24.50 to 25.50
Old Steel Rails, long, gross ton.....	18.00 to 18.50
Relaying Rails, 5½ lb. and up, gross ton.....	28.25 to 29.25
Old Car Wheels, gross ton.....	24.50 to 25.00
Low Phosphorus Scrap, gross ton.....	20.00 to 20.50

## Philadelphia.

PHILADELPHIA, Pa., July 9, 1907.

Business as usual at this season is more or less in a state of abeyance. It may be a little more so this year because of the uncertainty in regard to prices. There is an impression that a lower level is inevitable, under which consumers hesitate to place orders, although in most cases they have no special reasons for thinking that they will need less Iron than before. There are usually two great buying periods, one late in January or during February; the other late in July or during August. Last year purchases at about this season turned out excellently, but buyers were less successful in their operations early in 1907, as they mostly got in at prices higher than those now ruling, with but little prospect of amendment when deliveries on uncompleted contracts are made to them during the later months of the year. It is a case of history repeating itself. The success in 1906 was dimmed by oversanguineness in 1907, but after all it only evens things up. It should not be overlooked that makers have been delivering \$16 and \$18 Iron, when market prices were easily \$22 to \$24, or more, and if buyers happen to have Iron delivered to them when market prices are \$4 to \$5 less than they are paying, it is simply a case of "give and take." The immediate result, however, is to cause buyers to do some hard thinking. The result of the spring purchases is by no means stimulating and will doubtless lead to extreme caution in entering upon new operations. Buyers of Iron cannot claim to know it all, any more than sellers can, but, as the game is not yet finished, it is too soon to decide which side will be the winner. The chances are that the average of prices would not have been materially different if all the purchases during the past two years had been from hand to mouth, instead of 6, 9 and 12 months in advance. When the buying fever once begins it soon becomes epidemic and has to run its course, and nothing but the discovery that the idea of permanently high prices was merely a "brain storm" can change its course. The question that the trade is now considering is what will be the probable course of prices after the third quarter of the current year.

As we said before, buyers begin to realize that their purchases during the early months of the year have not turned out favorably, and as there is plenty of time before renewals will be necessary they will probably not be in a hurry to commit themselves so soon again. Sellers are not in a bad position by any means. They are carrying no stocks whatever, while for three or four months to come they are well sold ahead, but they also have a future to consider. It is never a pleasant thing to find that there is no market, even if they have nothing to sell, and that is just about where they are to-day. They will have something before the end of the year, and that is what troubles them. Consumers will also need Iron, but on which side will the need be greatest and the first to develop, and what prices will be acceptable to both sides? These are the questions that must be met in the near future, but who can tell to \$1, perhaps \$2 or \$3, what these figures will be? The only reasonably safe assertion is that they will not be higher.

**Pig Iron.**—The market is extremely dull, and prices are hardly quotable. Deliveries are being made satisfactorily, and for the present the absence of new demand is not felt. The attitude of the furnaces has completely changed, however, and from "nothing to offer" to "plenty to go round" is a change that is hardly realized yet. It obviously indicates an increase in production or a falling off in consumption, or it may be both; probably it is a little at both ends. Be that as it may, the supply at this time is about equal to the demand. This is disquieting only so far as it signifies changing conditions, which cannot at present be correctly estimated. This uncertainty tends to check immediate operations, and there is but little prospect of any large tonnages being taken until well on into next month, by which time it will be less difficult to form opinions in regard to the amount of material that is likely to be required during the late months of 1907 and the early months of 1908. Prices at the moment are all more or less subject to revisal at short notice, but, for such small business as can be done, prices for deliveries in buyers' yards, eastern Pennsylvania and adjoining districts, are about as follows: No. 2 X Foundry, third quarter, \$23 to \$23.50; fourth quarter, \$22.50 to \$22.75; Gray Forge, \$21.50 to \$22.25, according to date; Basic, \$23 for third quarter, and \$22 to \$22.50 for last quarter; Low Phosphorus, dull, but unchanged, at \$27.75 to \$28.

**Ferroalloys.**—No business of any importance has been reported in this district, but it is said that buyers could do from \$1 to \$2 better than last week's quotations, which were \$62 to \$64, according to date of delivery.

**Steel.**—The demand for Steel has fallen off considerably within the last few days, but specifications are coming in promptly, so that the mills are making full time as far as circumstances will permit. There is not much disposition to buy for forward delivery, although prices are unchanged at \$32.50 to \$33 for nearby deliveries of ordinary Rolling Billets, and \$36 to \$38 for Forging Steel.

**Plates.**—Business in this line is somewhat quiet, and the mills will soon be in a position to need some new business. Orders on hand, however, are for a considerable tonnage, and, although at the moment things look dull, great confidence is manifested in regard to the ultimate outcome. Prices are unchanged, as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel.....	1.85	1.90
Flange or Boiler Steel.....	1.95	2.05
Marine.....	2.20	2.25
Locomotive Firebox Steel.....	2.40	2.45
The above are base prices for ¼-in. and heavier. The following extras apply:		
3-16-in thick.....		\$0.10
Nos. 7 and 8, B. W. G.....		.15
No. 9, B. W. G.....		.25
Plates over 100 to 110 in.....		.05
Plates over 110 to 115 in.....		.10
Plates over 115 to 120 in.....		.15
Plates over 120 to 125 in.....		.25
Plates over 125 to 130 in.....		.50
Plates over 130 in.....		1.00

**Structural Material.**—The improvement noted last week has been maintained, and mills are now fully employed, chiefly with small business that comes in from day to day. This, in the aggregate, is quite important, but there are no large contracts that can be mentioned at the present time. Quotations remain at 1.85c. to 2c. for Beams, Angles and Channels, according to specifications.

**Bars.**—The Bar trade is somewhat erratic and far from satisfactory to the manufacturer. The cost of production is high, and 1.85c. for Best Refined Iron barely returns a new dollar for an old one, and while it is said that there is a good deal of Iron offered at less money, the quality is open to question. Steel Bars for prompt delivery command about the same price as Best Refined Iron, although for deliveries after next month quotations are nominally about 1.70c. to 1.75c.

**Sheets.**—Business keeps up well in this department, and the call for early deliveries is quite urgent, with prospects that indicate a continuance of these conditions for some time to come. Prices are firm as last quoted for mill shipments, with the usual advance on small lots, as follows:

a time is asked. Nothing has come of the recent reports that there would be an advance in Galvanized, and with the much weaker tone in the Spelter market it does not seem probable that any change in prices will be made, albeit the mills are far behind in deliveries. We quote: Blue Annealed Sheets, No. 10 gauge and heavier, 1.85c.; Nos. 11 and 12, 1.90c.; Nos. 13 and 14, 1.95c.; Nos. 15 and 16, 2.05c.; Box Annealed, Nos. 17 to 21, 2.35c.; Nos. 22 to 24, 2.40c.; Nos. 25 and 26, 2.45c.; No. 27, 2.50c.; No. 28, 2.60c.; No. 29, 2.75c.; No. 30, 2.85c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.65c.; Nos. 12 and 14, 2.75c.; Nos. 15 and 16, 2.85c.; Nos. 17 to 21, 3c.; Nos. 22 and 24, 3.15c.; Nos. 25 and 26, 3.35c.; No. 27, 3.55c.; No. 28, 3.75c.; No. 29, 4c. and No. 30, 4.25c. We quote No. 28 gauge Painted Roofing Sheets at \$1.85 per square, and Galvanized Roofing Sheets, No. 28 gauge, \$3.25 per square, for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances.

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**Merchant Steel.**—The market is rather quiet. We quote: Smooth Finished Machinery Steel, 1.85c. to 2c., depending on quality; Flat Sleigh Shoe, 1.65c. to 1.75c.; Cutter Shoe, 2.15c. to 2.20c.; Toe Calk Steel, 2.10c. to 2.15c.; Railroad Spring Steel, 1.75c. to 1.80c.; Crucible Tool Steel, 6c. to 8c., for ordinary grades, and 10c. and upward for special grades. We quote Cold Rolled Shafting at 50 per cent. off in carloads, and 45 per cent. in less than carloads, delivered in base territory.

**Railroad Spikes.**—Producers are well sold up. The market on standard sizes is strong, but not very active, as the railroads have not been placing very large Rail orders of late, and generally make their heavy purchases of Spikes at the same time that they buy Rails. We quote Standard Spikes at \$2.20, but occasionally one or two producers will do \$2.15 on a very desirable order. In small sizes the market is recovering from the disturbance of a producer taking on considerable business at cut prices, and the quotations given last week, \$2.40 to \$2.50, are being well adhered to.

**Merchant Pipe.**—The demand for Merchant Pipe continues excellent and mills are sold uncomfortably far ahead. Line Pipe is quieter, most of the mills being well filled up for the season, while most of the important contracts have been closed. Discounts on Steel Pipe are as follows:

Merchant Pipe.		Jobbers, carloads.	
		Black.	Galv.
1/4 to 1/2 in.	.....	.65	.49
3/8 in.	.....	.67	.53
1/2 in.	.....	.69	.57
3/4 to 6 in.	.....	.73	.63
7 to 12 in.	.....	.70	.55
Extra strong, plain ends:			
1/4 to 1/2 in.	.....	.58	.46
1/2 to 4 in.	.....	.65	.53
4 1/2 to 8 in.	.....	.61	.49
Double extra strong, plain ends:			
1/4 to 8 in.	.....	.54	.43

All above discounts are subject to 1 point on the base and 5 per cent. on the net.

Official discounts on Iron Pipe, which are shaded one-half point or more to the large trade, are as follows, f.o.b. Pittsburgh:

Standard Genuine Iron Pipe.		Black.	Galv.
3/4 to 6 in.	.....	.67	.57
1/2 in.	.....	.62	.50
3/8 in.	.....	.60	.42
1/4 and 1/2 in.	.....	.58	.42
7 to 12 in.	.....	.62	.47
Extra Heavy Iron Pipe, Plain Ends.			
1/4, 1/2 and 3/8 in.	.....	.62	.40
1/2 to 4 in.	.....	.59	.47
4 1/2 to 8 in.	.....	.55	.42

**Iron and Steel Scrap.**—The market is very dull and inclined to weakness. The rolling mills are buying scarcely anything, while the foundries are buying much less Cast Scrap, &c., for prompt delivery, as they are getting better deliveries of Pig Iron. Regular prices for No. 1 Cast Scrap are unchanged, at \$21 to \$21.50, but it is no longer the case that a dealer able to make immediate delivery of a good lot can exact a premium. Heavy Melting Stock is particularly dull. One consumer in Pittsburgh, who takes a particularly careful selection, bought a few hundred tons, paying \$18.65. The market, however, is not over \$18.50 at the outside, and the best bid of dealers is generally \$18. We quote prices not overly strong, as follows: Heavy Steel Scrap, \$18 to \$18.50, for Pittsburgh, Steubenville and Sharon delivery, prices depending on quality; No. 1 Railroad Wrought Scrap, \$18.50 to \$18.75, and No. 2, \$18 to \$18.25; Bundled Sheet Scrap, \$16.75; No. 1 Busheling Scrap, \$18 to \$18.25; No. 2 Busheling Scrap, \$15 to \$15.25; Old Steel Rails, short pieces, for Open Hearth purposes, \$18.25 to \$18.50; Old Steel Rails, rerollers, \$20; Low Phosphorus Melting Stock, \$22.50 to \$23; Cast Iron Borings, \$13.75 to \$14; Stove Plate, \$16.50 to \$16.75; Old Car Wheels, \$26 to \$26.25; Steel Axles, \$21.75 to \$22; Grate Bars, \$16.25 to \$16.50; No. 1 Cast Scrap, \$21 to \$21.50; all above prices are per gross ton, f.o.b. Pittsburgh.

**Boiler Tubes.**—The market is fairly active, with prices strong and premiums occasionally paid for prompt shipment. We quote:

Boiler Tubes.		Iron.	Steel.
1 to 1 1/4 in.	.....	.42	.47
1 1/4 to 2 1/4 in.	.....	.42	.59
2 1/4 in.	.....	.47	.61
2 3/4 to 5 in.	.....	.52	.65
6 to 13 in.	.....	.42	.59
1 1/2 in. and smaller, over 18 ft. long, 10 per cent. net extra.			
2 3/4 in. and larger, over 22 ft. long, 10 per cent. net extra.			

**Coke.**—The market is hardly as firm as last week, but is still considerably stronger than it was a month ago. The contract market has been much quieter than ordinarily at this time of year. More furnaces than usual contracted for the entire year, instead of taking only the first half, and in a number of instances where contracts expired July 1 the furnaces have concluded to buy from time to time, although they may wind up by making contracts for the fourth quarter. Quite a number of new ovens are being built, especially in the Klondike District of the Connells-ville region, and while many were expected to come in about this time, the bad weather earlier in the year delayed construction to such an extent that they will not be in before September or October. We quote Standard Connells-ville Furnace Coke at \$2.40 to \$2.50 at oven for prompt shipment, while contracts are \$2.50 to \$2.65, the higher price being only in the case of Coke of a particularly good analysis. Standard Connells-ville 72-hr. Foundry Coke is pretty firm at \$3 to \$3.25 at oven for either spot or contract.

## Cincinnati.

FIFTH AND MAIN STS., July 10, 1907.—(By Telegraph.)

**Pig Iron.**—The lull in the market continues to be as marked as a week since. Actual transactions have been small and of no special importance. Those consumers who have not fully covered for third quarter requirements are evidently satisfied to let well enough alone and wait such developments as the future may bring forth. In the interval they are pursuing a hand to mouth policy, merely buying enough to tide them over the next month or two, trusting that by that time prices will have found a lower level, or at least be sufficiently well outlined as to inspire confidence in the outcome. At the same time, it is apparent that the furnaces are making no special efforts to force matters, but are well satisfied to maintain the record of the past month or two in forwarding practically all of the current make, leaving very little to give to the late comers. The premium on spot Iron has practically disappeared, and prices for nearby and third quarter delivery are virtually on a parity, or \$20.50 to \$21, Birmingham. Fourth quarter demand has been so light that prices are well nigh unobtainable, \$19.50 to \$20 being leading quotations. High Silicon Irons are said to be in fair demand, but no sales are recorded of any considerable



tonnage. There have been several small inquiries for Gray Forge, but as a general proposition there is little activity in the lower grades. Aside from an inquiry for 500 or 600 tons from an Eastern concern and an indefinite tonnage desired by a melter in Indiana, there is none reported from this territory. Freight rates from Hanging Rock District to Cincinnati are \$1.15, and from Birmingham, \$3.25. We quote for July delivery, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1.....	\$24.25 to \$24.75
Southern Coke, No. 2.....	23.75 to 24.25
Southern Coke, No. 3.....	23.25 to 23.75
Southern Coke, No. 4.....	22.50 to 23.00
Southern Coke, No. 1 Soft.....	24.25 to 24.75
Southern Coke, No. 2 Soft.....	23.75 to 24.25
Southern Coke, Gray Forge.....	21.25 to 21.75
Southern Coke, Mottled.....	20.25 to 20.75
Ohio Silvery, 8 per cent. Silicon.....	30.15 to 30.65
Lake Superior Coke, No. 1.....	24.15 to 24.65
Lake Superior Coke, No. 2.....	23.65 to 24.15
Lake Superior Coke, No. 3.....	23.15 to 23.65

#### Car Wheel Irons.

Standard Southern Car Wheels.....	\$29.00 to \$29.50
Lake Superior Car Wheels.....	27.50 to 28.00

**Coke.**—A large percentage of melters have contracted for the year's supply, yet new business is being booked each week of considerable tonnage. Prices are firm and well maintained. We quote best brands of Connellsville and Virginia Foundry at \$3 to \$3.25, f.o.b. ovens.

**Finished Iron and Steel.**—Specifications on current contracts have not been as heavy during the past week. Deliveries continue quite slow and Structural mills are making only fairly good shipments. Plate mills are getting somewhat filled up and deliveries are not very prompt, quoting 30 days on Universal Plates and from four to six weeks on Sheared Plates. Structural mills have opened their books for the first half of 1908, but so far no considerable sales have been reported. We quote, f.o.b. Cincinnati, as follows: Iron Bars, carload lots, 1.80c., with half extras; small lots from store, 2c., with full extras. Steel Bars, carload lots, 1.75c., half extras; smaller lots from store, 1.95c., with full extras. Base Angles, carload lots, 1.85c. Beams and Channels, carload lots, 1.85c., base. Plates, ¼-in. and heavier, carload lots, 1.85c., base, and smaller lots from store, 2.25c. Sheets No. 16, carload lots, 2.05c., and smaller lots from store, 2.60c.; No. 14, carload lots, 1.95c., and smaller lots from store, 2.50c. Steel Tire, 1 x ¼ in. or heavier, 1.95c., in carload lots.

**Old Material.**—A fair sprinkling of sales is reported. We quote dealers' prices, f.o.b. Cincinnati, about as follows:

No. 1 R. R. Wrought, net ton.....	\$17.00 to \$17.50
Cast Borings, net ton.....	9.50 to 10.00
Steel Turnings, net ton.....	12.50 to 13.00
No. 1 Cast Scrap, net ton.....	18.00 to 18.50
Old Iron Axles, net ton.....	26.00 to 26.50
Old Iron Rails, gross ton.....	24.50 to 25.50
Old Steel Rails, long, gross ton.....	18.00 to 18.50
Relaying Rails, 56 lb. and up, gross ton.....	28.25 to 29.25
Old Car Wheels, gross ton.....	24.50 to 25.00
Low Phosphorus Scrap, gross ton.....	20.00 to 20.50

## Philadelphia.

PHILADELPHIA, PA., July 9, 1907.

Business as usual at this season is more or less in a state of abeyance. It may be a little more so this year because of the uncertainty in regard to prices. There is an impression that a lower level is inevitable, under which consumers hesitate to place orders, although in most cases they have no special reasons for thinking that they will need less Iron than before. There are usually two great buying periods, one late in January or during February; the other late in July or during August. Last year purchases at about this season turned out excellently, but buyers were less successful in their operations early in 1907, as they mostly got in at prices higher than those now ruling, with but little prospect of amendment when deliveries on uncompleted contracts are made to them during the later months of the year. It is a case of history repeating itself. The success in 1906 was dimmed by oversanguineness in 1907, but after all it only evens things up. It should not be overlooked that makers have been delivering \$16 and \$18 Iron, when market prices were easily \$22 to \$24, or more, and if buyers happen to have Iron delivered to them when market prices are \$4 to \$5 less than they are paying, it is simply a case of "give and take." The immediate result, however, is to cause buyers to do some hard thinking. The result of the spring purchases is by no means stimulating and will doubtless lead to extreme caution in entering upon new operations. Buyers of Iron cannot claim to know it all, any more than sellers can, but, as the game is not yet finished, it is too soon to decide which side will be the winner. The chances are that the average of prices would not have been materially different if all the purchases during the past two years had been from hand to mouth, instead of 6, 9 and 12 months in advance. When the buying fever once begins it soon becomes epidemic and has to run its course, and nothing but the discovery that the idea of permanently high prices was merely a "brain storm" can change its course. The question that the trade is now considering is what will be the probable course of prices after the third quarter of the current year.

As we said before, buyers begin to realize that their purchases during the early months of the year have not turned out favorably, and as there is plenty of time before renewals will be necessary they will probably not be in a hurry to commit themselves so soon again. Sellers are not in a bad position by any means. They are carrying no stocks whatever, while for three or four months to come they are well sold ahead, but they also have a future to consider. It is never a pleasant thing to find that there is no market, even if they have nothing to sell, and that is just about where they are to-day. They will have something before the end of the year, and that is what troubles them. Consumers will also need Iron, but on which side will the need be greatest and the first to develop, and what prices will be acceptable to both sides? These are the questions that must be met in the near future, but who can tell to \$1, perhaps \$2 or \$3, what these figures will be? The only reasonably safe assertion is that they will not be higher.

**Pig Iron.**—The market is extremely dull, and prices are hardly quotable. Deliveries are being made satisfactorily, and for the present the absence of new demand is not felt. The attitude of the furnaces has completely changed, however, and from "nothing to offer" to "plenty to go round" is a change that is hardly realized yet. It obviously indicates an increase in production or a falling off in consumption, or it may be both; probably it is a little at both ends. Be that as it may, the supply at this time is about equal to the demand. This is disquieting only so far as it signifies changing conditions, which cannot at present be correctly estimated. This uncertainty tends to check immediate operations, and there is but little prospect of any large tonnages being taken until well on into next month, by which time it will be less difficult to form opinions in regard to the amount of material that is likely to be required during the late months of 1907 and the early months of 1908. Prices at the moment are all more or less subject to revision at short notice, but, for such small business as can be done, prices for deliveries in buyers' yards, eastern Pennsylvania and adjoining districts, are about as follows: No. 2 X Foundry, third quarter, \$23 to \$23.50; fourth quarter, \$22.50 to \$22.75; Gray Forge, \$21.50 to \$22.25, according to date; Basic, \$23 for third quarter, and \$22 to \$22.50 for last quarter; Low Phosphorus, dull, but unchanged, at \$27.75 to \$28.

**Ferroalloys.**—No business of any importance has been reported in this district, but it is said that buyers could do from \$1 to \$2 better than last week's quotations, which were \$62 to \$64, according to date of delivery.

**Steel.**—The demand for Steel has fallen off considerably within the last few days, but specifications are coming in promptly, so that the mills are making full time as far as circumstances will permit. There is not much disposition to buy for forward delivery, although prices are unchanged at \$32.50 to \$33 for nearby deliveries of ordinary Rolling Billets, and \$36 to \$38 for Forging Steel.

**Plates.**—Business in this line is somewhat quiet, and the mills will soon be in a position to need some new business. Orders on hand, however, are for a considerable tonnage, and, although at the moment things look dull, great confidence is manifested in regard to the ultimate outcome. Prices are unchanged, as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel.....	1.85	1.90
Flange or Boiler Steel.....	1.95	2.05
Marine.....	2.20	2.25
Locomotive Firebox Steel.....	2.40	2.45
The above are base prices for ¼-in. and heavier. The following extras apply:		
3-16-in. thick.....		Extra per 100 lb. \$0.10
Nos. 7 and 8, B. W. G.....		.15
No. 9, B. W. G.....		.25
Plates over 100 to 110 in.....		.05
Plates over 110 to 115 in.....		.10
Plates over 115 to 120 in.....		.15
Plates over 120 to 125 in.....		.25
Plates over 125 to 130 in.....		.50
Plates over 130 in.....		1.00

**Structural Material.**—The improvement noted last week has been maintained, and mills are now fully employed, chiefly with small business that comes in from day to day. This, in the aggregate, is quite important, but there are no large contracts that can be mentioned at the present time. Quotations remain at 1.85c. to 2c. for Beams, Angles and Channels, according to specifications.

**Bars.**—The Bar trade is somewhat erratic and far from satisfactory to the manufacturer. The cost of production is high, and 1.85c. for Best Refined Iron barely returns a new dollar for an old one, and while it is said that there is a good deal of Iron offered at less money, the quality is open to question. Steel Bars for prompt delivery command about the same price as Best Refined Iron, although for deliveries after next month quotations are nominally about 1.70c. to 1.75c.

**Sheets.**—Business keeps up well in this department, and the call for early deliveries is quite urgent, with prospects that indicate a continuance of these conditions for some time to come. Prices are firm as last quoted for mill shipments, with the usual advance on small lots, as follows:



Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 to 26, 3c.; No. 27, 3.10c., and No. 28, 3.20c.

**Old Material.**—The market for Old Material is approaching demoralization. There is virtually no demand, so that Scrap that must be moved is almost unquotable. The Steel mills have their yards full of Material, and are nearly all embargoed, so that they buy on their own terms or not at all. Quotations, of course, cannot be given with much closeness, but a fair average of bids and offers for deliveries in buyers' yards would be about as follows:

Steel Crops.....	\$17.75 to \$18.50
No. 1 Steel Scrap.....	17.50 to 18.00
Low Phosphorus.....	24.50 to 25.00
Old Steel Axles.....	20.50 to 21.00
Old Iron Axles.....	29.00 to 30.00
Old Iron Rails.....	25.00 to 25.50
Old Car Wheels.....	25.00
Choice No. 1 R. R. Wrought.....	19.00 to 19.50
No. 1 Yard Scrap.....	17.00 to 17.50
Long and Short.....	17.00
Machinery Scrap.....	19.00 to 19.50
Wrought Iron Pipe.....	15.50 to 16.00
No. 1 Forge Fire Scrap.....	16.50 to 17.00
No. 2 Light.....	9.50 to 10.00
Wrought Turnings.....	15.00 to 16.00
Stove Plate.....	16.50 to 17.00
Cast Borings.....	14.25 to 14.75
Grate Bars.....	15.50 to 16.00

## Birmingham.

BIRMINGHAM, ALA., July 7, 1907.

**Pig Iron.**—Sales the past week have been limited to a few small orders, the largest reported being for 150 tons. Producers are apparently holding to former quotations, with the exception of spot Iron, which is now on about the same basis as third quarter delivery. In some instances Iron on the track commands a premium of 50c. per ton, but on shipments within a few days after the receipt of the order no advance over the regular price for third quarter is required. Producers, as a rule, are taking an optimistic view of the future, and are pointing to the fact that there was never really any good reason for thinking that there might in the near future be any cessation of the prosperity we have been enjoying, and those who have been pessimistically inclined are rapidly changing their views, since good crops this year are now practically assured, and all manufacturers of finished Iron are still crowded with orders. That consumption is going on at record breaking rates can be easily seen from the urgent requests for delivery of Iron on contracts, and in many instances solicitations to anticipate shipments. With the sold up condition of the furnaces for the remaining months of this year, and the large number of melters still uncovered for a part of their requirements for this period, it would seem foolish for the furnacemen to make any concessions in price for shipment during the last half. On the other hand, all consumers of Iron are of the opinion that the price of their raw material is entirely too high. The furnaces are making a large profit, while the melter can scarcely exist on the small margin at which he is forced to do business. There is no doubt that the melters are largely responsible for the high prices prevailing to-day, as by covering their requirements so far in advance they place the furnace people in position to make all kinds of exaggerated claims as to sold up conditions, shortage of Iron, &c., and the melters, becoming excited, bid the price up to such an extent that there is absolutely nothing left for them. That production is now more than keeping pace with consumption is self-evident. The furnaces now in course of construction which will go in blast the latter part of this year and the first of next year should assure every melter in the country that there will be ample Iron produced in 1908 for every requirement. When this fact is recognized by all, lower prices are likely to prevail. Some of the largest melters in the country are now formulating a plan looking toward a betterment of conditions from the consumers' standpoint.

**Cast Iron Pipe.**—Conditions in the Pipe market continue about the same as have been prevailing for some time. No large contracts are in sight, but numerous small orders are received daily, which in the aggregate amount to a satisfactory tonnage. Prices are well maintained, and are approximately as follows per net ton: 4 to 6 in., \$36; 8 to 12 in., \$34; over 12-in. average, \$31, with \$1 per ton extra for Gas Pipe.

**Old Material.**—While the Scrap market is not so active as could be desired, the tone is somewhat better than last week. The demand for all grades of Cast continues good. Dealers' quotations are about as follows per gross ton, f.o.b. cars here:

Old Iron Rails.....	\$22.00 to \$22.50
Old Iron Axles.....	18.50 to 19.00
Old Steel Axles.....	17.50 to 18.00
Old Car Wheels.....	20.50 to 21.00
No. 1 Railroad Wrought.....	18.50 to 19.00
No. 2 Railroad Wrought.....	13.00 to 13.50
No. 1 Country Wrought.....	13.00 to 13.50
No. 2 Country Wrought.....	12.00 to 12.50
Wrought Pipe and Flues.....	13.50 to 14.00
Railroad Malleable.....	14.00 to 14.50
No. 1 Steel.....	15.00 to 15.50
No. 1 Machinery Cast.....	16.50 to 17.00
Stove Plate and Light Cast.....	13.00 to 13.50
Cast Borings.....	8.50 to 9.00

## New York.

NEW YORK, July 10, 1907.

**Pig Iron.**—The market has been very quiet, with some weakness developing in the low grades and in misfits. It is estimated that of Foundry Iron, 90 per cent. of the requirements for the second half for New England delivery has been covered. The percentage is much smaller in this district. We quote for Northern No. 1 Foundry, tidewater delivery, \$24 to \$25; for No. 2 Foundry, \$23.25 to \$23.50, and for No. 2 Plain, \$22.50 to \$23. No. 2 Southern Iron is nominally quoted at \$25.25 to \$25.50. Scotch Iron is selling at \$23.50 to \$24 for No. 1 and \$23 to \$23.50, on dock, for No. 3.

**Steel Rails.**—Scattering sales aggregating 7000 tons are all that is reported this week, outside of the 13,500 tons for the San Pedro & Los Angeles, taken by the Lackawanna Steel Company for this year's delivery.

**Structural Material.**—Nothing of importance has been closed within the past week. No announcement has yet been made as to the disposition of the contract on the new power station of the New York Edison Company, which will take about 12,000 tons of Structural Material. The Northern Pacific bridge contract has not yet been placed, nor has anything definite developed as to the time when it may come on the market. The Western Pacific is expected to purchase a considerable quantity of bridge work, but no decision has been made regarding it. The leading bridge builders are so well supplied with work that for the present they are quite satisfied that conditions should be quiet. The future is regarded with considerable confidence. New specifications are being received by the Structural mills in exceedingly satisfactory quantities, and a fair volume of new business is being booked. We quote mill shipments as follows, for tidewater deliveries: Beams, Channels, Angles and Zees, 1.86c.; Tees, 1.90c.; Bulb Angles and Deck Beams, 2c. On Beams 18 to 24 in. and Angles over 6 in. the extra is 0.10c. Sales are made out of stock material cut to length at 2¼c. to 2½c.

**Bars.**—Manufacturers of Bar Iron report a moderate volume of business, but with possibly some increase in inquiry. Best Refined is quoted at 1.65c. to 1.70c., Pittsburgh, or 1.81c. to 1.86c., tidewater. The demand for Steel Bars is not so active as it has been, although some contracts have been placed. Quotations maintained at 1.60c., Pittsburgh, or 1.76c., tidewater, for delivery beginning three to four months hence, and 1.86c. or higher for early delivery.

**Plates.**—Local orders are hardly up to the mark of the past month, although the Eastern mills report a much better volume of business coming from other sections. Prices are well maintained. Quotations for tidewater delivery are as follows: Sheared Tank Plates, 1.86c. to 1.96c.; Flange Plates, 1.96c. to 2.06c.; Marine Plates, 2.26c. to 2.36c.; Fire Box Plates, 2.75c. to 3.50c., according to specifications.

**Cast Iron Pipe.**—M. J. Drummond & Co. of this city secured about 6300 tons of the New York City contracts placed last week. It is probable that the Hoboken order, about 1800 tons, will be placed this week. Outside of these matters the market has been quiet, with sales confined to carload lots. The City of New York appears for some time to come to be the principal hope of those who are looking for Pipe business. The city will require very large quantities to complete the work which has been planned by the municipality for this season. Buyers generally are looking for lower prices and are in no hurry to place contracts. Carload lots of 6-in. are now quoted at \$34.50 to \$35 per net ton at tidewater.

**Old Material.**—The demand is light, as consumers are now either closed for repairs or are cleaning up their stocks, as usual at this season. Embargoes have also been declared at nearly all the leading Eastern Steel mills, and dealers are thus unable to make further shipments on contract. Prices have not been affected to any considerable extent by this condition of affairs, as stocks in dealers' hands are so light that they are not impelled to attempt to force anything on the market. The railroad lists this month are also unusually small. The railroad companies have been cleaning up their accumulations so well for the past two or three months that they now find only small quantities available. Dealers take a hopeful view of the future, believing that the early part of August will bring a much better demand. Quotations, per gross ton, f.o.b. New York, are as follows:

Old Girder and T Rails for Melting.....	\$15.25 to \$15.75
Heavy Melting Steel Scrap.....	15.25 to 15.75
Old Steel Rails rerolling lengths.....	18.00 to 19.00
Relaying Rails.....	27.50 to 28.00
Old Iron Rails.....	23.50 to 24.00
Standard Hammered Iron Car Axles.....	29.00 to 29.50
Old Steel Car Axles.....	19.50 to 20.00
No. 1 Railroad Wrought.....	18.50 to 19.00
Iron Track Scrap.....	16.50 to 17.00
No. 1 Yard Wrought, long.....	16.50 to 17.00
No. 1 Yard Wrought, short.....	16.00 to 16.50
Wrought Pipe.....	13.50 to 14.00
Light Iron.....	10.00 to 10.50
Cast Borings.....	11.50 to 12.00
Wrought Turnings.....	13.50 to 14.00
Old Car Wheels.....	22.50 to 23.00
No. 1 Heavy Cast, broken up.....	18.00 to 18.50
Stove Plate.....	15.50 to 16.00
Grate Bars.....	13.00 to 13.50
Malleable Cast.....	19.50 to 20.00

## Metal Market.

NEW YORK, July 10, 1907.

**Pig Tin.**—The corner which developed in London has broken, largely of its own weight, and the backwardation of £18 which was recorded July 8 has now dropped to £8. Business in this country has been dull, and the market peculiar and difficult to gauge, owing to Tin selling here below London parity. The holiday occurring in the middle of last week naturally had some influence in causing the poor business there. The price has declined almost continuously since our last issue, as on July 5 sales were made at 42.45c., on July 8 at 42c., and a little was sold July 9 at 41.50c. To-day Tin was sold at 41.35c. Consumers are not buying freely, and it appears that the trade in general is not taking as much metal as a few months ago. The London market is lower to-day, at £188 10s. for spot, and £180 10s. for futures. The arrivals so far this month have been 2055 tons, and there are afloat 2288 tons.

**Copper.**—The long expected official cut in Copper prices came July 8, when some of the leading producers announced that they were prepared to accept orders for Electrolytic for delivery during July, August and September at 22c. After the first announcement was made the other sellers of Copper lost no time in following the lead, so, by Tuesday night, most of the sellers were willing to quote lower prices, as follows: Lake, delivered, 30 days, 22.25c., to 22.50c.; Electrolytic, 22c., to 22.25c.; Casting grades, 21c. to 21.50c. There have been a number of orders booked at these figures for delivery in Europe, but this is only natural, in view of the fact that for the last three months business has been practically at a standstill, and now many consumers are in urgent need of the metal. It is to be expected that many products which are largely composed of Copper will shortly be reduced in price, among them being all grades of brass goods in the cruder forms, and Copper sheets; in fact, there has been some cutting in the price of brass castings already. Reports that a leading Lake producer has sold a large amount of metal for forward delivery should not be taken too seriously, as frequently announcements of this kind are misleading, and they are rarely authorized. The question uppermost in the minds of the producers and consumers at this time is whether the cut has been drastic enough or whether other revisions in price will have to be made before any large amount of forward business is booked. American consumers have been backward in making contracts at the new figures, and as they still have considerable May and June Copper bought at higher prices, they can await developments. With consumers in Europe, however, conditions are different, and they need Copper quickly. This demand can be supplied with ease, as the leading producers and some others have Copper which is available for any delivery. The London market closes lower to-day, at £98 for spot and £90 for futures. Best Selected is nominally quoted at £105. The exports have been light, amounting to but 3823 tons so far this week.

**Waterbury Average.**—The Waterbury Copper average for June was 26c.

**Pig Lead.**—The cut in price by the leading interest last week, which reduced the price to the lowest figure since November, 1905, brought business. Lead at these figures looks cheap. Spot in New York is selling at 5.30c., and in St. Louis Lead can be had at 5.15c. The American Smelting & Refining Company is accepting orders only at the price current on date of shipment. Its price governing old contracts is 5.25c.

**Spelter.**—This metal continues very dull. Although lower prices have been made, they have not stimulated any inquiry. Spelter can be had at 6.30c., New York, and 6.12½c. to 6.15c., St. Louis.

**Ferroalloys.**—Some sales of 50 per cent. Ferrosilicon have been made at \$108 for prompt shipment, but futures can be had at \$104. Ferromanganese is easy, with not much doing, although a Southern consumer is in the market. Prices are unchanged, at \$63, Pittsburgh, for forwards.

**Antimony.**—Future deliveries of all grades of Antimony can be had at lower prices—Cookson's at 12c., Hallett's at 10c., and other grades at 9.50c. Spot deliveries are held at from ½c. to 1c. above these figures.

**Old Metals.**—The dealers in Old Metals, like others well informed in the Copper trade, had pretty generally revised their prices. Consequently, the official announcement of lower Copper prices this week was discounted. Dealers' selling prices for large lots are as follows:

	Cents.
Copper, Heavy Cut and Crucible.....	20.50 to 21.00
Copper, Heavy and Wire.....	19.50 to 20.00
Copper, Light and Bottoms.....	18.50 to 19.00
Brass, Heavy.....	14.00 to 14.25
Brass, Light.....	10.75 to 11.00
Heavy Machine Composition.....	18.00 to 18.25
Clean Brass Turnings.....	12.75 to 13.00
Composition Turnings.....	15.50 to 16.00
Lead, Heavy.....	4.75
Tea Lead.....	4.37½
Zinc Scrap.....	5.25

**Tin Plates.**—Some large orders have been taken by the leading interest, and it is understood that a few have been in competition with foreign makers. No export orders have yet come to light, but some are pending. Prices are steady, at \$3.90 f.o.b. Pittsburgh, and \$4.00 f.o.b. New York, for 100 lb. 1C. Coke Plates.

## Iron and Industrial Stocks.

NEW YORK, July 10, 1907.

A better tone characterized dealings on the stock exchanges up to Monday. Prices of iron and industrial stocks stiffened considerably, in accordance with the more cheerful sentiment. On Tuesday, however, disquieting reports came from Washington regarding a further campaign against large corporations, and prices wilted. The highest prices since our last report were realized on Saturday or Monday. United States Steel common touched 39 and the preferred 101; Car & Foundry common 44½; Locomotive common 59¾; Pressed Steel common 38, preferred 91½; Colorado Fuel 33¾; Railway Spring common 43; Republic common 30, preferred 85; Sloss-Sheffield common 59; Cast Iron Pipe common 36¾. Attention had been attracted to American Steel Foundries preferred by reason of the action of some of the stockholders, who are advertising a proposed movement to compel the directors to resume the payment of dividends, which have been accruing for several years, the claim being made that earnings are now sufficient to justify a reasonable division of the profits. This stock sold on Monday at 41, which was an advance of 3% over the Thursday previous. Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 35½, preferred 99½; Car & Foundry common 42½, preferred 99½; Locomotive common 57½, preferred 104½; Steel Foundries common 7¾, preferred 38½; Colorado Fuel 30½; Pressed Steel common 35, preferred 91½; Railway Spring common 42½; Republic common 27½, preferred 84; Sloss-Sheffield common 57¼; Tennessee Coal 140½; Cast Iron Pipe common 35, preferred 79; Can common 5¼, preferred 53½.

Official announcement was made July 5 by the Westinghouse Electric & Mfg. Company that it had sold an entire issue of \$6,000,000 three-year 6 per cent. notes, dated August 1, 1907, and maturing August 1, 1910, to Kuhn, Loeb & Co. These notes were issued to furnish funds with which to retire a similar amount of 5 per cent. notes which mature on August 1. The new issue is secured by deposit with the Mercantile Trust Company of \$6,000,000 of consolidated mortgage 5 per cent. first lien bonds of the Lackawanna & Wyoming Valley Rapid Transit Company; \$3,000,000 of assenting stock of the Westinghouse Electric & Mfg. Company, and \$3,000,000 of first mortgage debenture stock of the British Westinghouse Electric Company, making a total of \$12,000,000 in recognized securities of merit. The new notes also are indorsed by the Security Investment Company, Pittsburgh. They have been placed on the market by the bankers at 97½ and interest.

**Dividends.**—The Harbison-Walker Refractories Company has declared the regular quarterly dividend of 1½ per cent. on the preferred stock, payable July 20.

The Monongahela River Consolidated Coal & Coke Company has declared a semiannual dividend of 3½ per cent., payable July 25.

The International Steam Pump Company has declared a quarterly dividend of 1½ per cent. on the preferred stock, payable August 1.

The machine shop of Guylee & Deyo, Poughkeepsie, N. Y., has been purchased by Charles H. C. Tiffany of Waterbury, Conn., who will operate the shop for general machine, blacksmith and pattern work. The shop will be known as the Charles H. Tiffany Machine Shop. Several large uncompleted contracts will be carried out by the new owner, who will add new machinery and make many alterations in the near future. Mr. Guylee and Mr. Deyo will remain in the employ of Mr. Tiffany for the present. Mr. Tiffany has had long experience in machine work, and for the past 18 months has been connected with the Poughkeepsie Foundry & Machine Company.

In 17 independent boiler tests Donkin and Kennedy found the heat lost up the stack, when no economizer is used, to range between 9.4 and 31.8 per cent. of the total heat of combustion. As it is not practicable to cool the gases to atmospheric temperature it is evidently impossible to utilize all the heat, but the ordinary economizer should, with mechanical draft, show a saving of between 10 and 20 per cent.



### The Amalgamated Conference Fails to Agree.

PITTSBURGH, PA., July 10, 1907.—(By Telegraph.)—The conference between the Amalgamated Association and the Republic Iron & Steel Company adjourned at 11.30 this morning, having failed to reach any agreement on the wage scale or to settle any disputed points, and the whole matter goes before the Conciliation Board. The workmen demand the convention scale except for two unimportant footnotes, which they had conceded to the Western Bar Iron Association. The Republic Company will probably demand some concessions from the existing scale. The company has selected Henry W. Hedly of Youngstown, and the men Ben I. Davis, attorney, of Birmingham. They will choose a third conciliator. The two sides will argue before them, and if they make no agreement the conciliators will make recommendations, which will not be binding. The mills can operate on the previous scale until August 10, when a settlement is expected.

### The Scout Cruiser Birmingham.

The scout cruiser Birmingham, launched May 29 at the Fore River Shipbuilding Company's yards at Quincy, Mass., is an entirely new type for the United States Navy. The estimated speed, 24 knots, is greater than that of any other cruiser of the navy, and is exceeded only by that of the torpedo boats and destroyers, and, while it is slightly less than that of the English scouts now building, the difference in speed is more than compensated for by the ability to maintain the high speed in all conditions of weather, more than twice the coal capacity of the English scouts, and, consequently, a greatly increased radius of action. The plans called for the following:

Length over all.....	423 ft.
Breadth, moulded.....	46½ ft.
Draft, fully loaded.....	19 ft.
Depth amidship, moulded.....	36½ ft.
Displacement, fully loaded.....	4640 tons.
Total coal capacity.....	1250 tons.
Feed water total.....	190 tons.
Maximum speed, average of 4 hrs. run.....	24 knots.
Steaming radius at 10 knots per hr., about.....	6250 knots.
Steaming radius at full speed, about.....	1875 knots.
Maximum indicated horsepower.....	16,000
Indicated horsepower, auxiliaries.....	400

The freeboard of the vessel is greater than that of any other vessel in the navy, and insures good seagoing qualities. Ample subdivision insures the vessel keeping afloat with no serious change of trim or loss of stability if several of the compartments are pierced. Particular attention has been paid to the longitudinal strength of the vessel and to the strength of the water tight bulkheads, that they may withstand pressure due to flooding of any compartment. The hull is of steel throughout. Two continuous longitudinal bulkheads pass through the engine and boiler spaces, one on each side, extending from the bottom of the vessel to the main deck. Between these and extending throughout the boiler and engine room is an inner bottom, to protect the vessel from injury in case of grounding.

Nickel steel armor plate protects the machinery space and the steering engine. The battery consists of two 5-in. and six 3-in. rapid fire guns and two 21-in. submerged torpedo tubes. The magazines are arranged to carry half the total supply of ammunition at each end of the vessel, and there are four motor driven ammunition hoists.

The engines are of the vertical twin screw four-cylinder triple expansion type, of a combined indicated horsepower of 16,000, 250 lb. initial steam pressure. The stroke is 3 ft. and the speed 200 rev. per min. There are 12 water tube Express type boilers, containing a total grate surface of 693 sq. ft., and a total heating surface of 37,080 sq. ft. An evaporating and distilling plant capable of evaporating and condensing 16,000 gal. of water per day is installed, and a refrigerating plant of 2 tons capacity. The vessel is arranged for steam heating and electric lighting; current for the latter and the various

electric motors is furnished by three 32-kw. 125-volt steam driven generating sets. The quarters accommodate 18 officers and 340 men.

### Canadian Interest in Native Ore.

TORONTO, July 5, 1907.—A. B. Wilmott, mining expert of the Lake Superior Corporation, has been looking over the iron ore situation in the Thunder Bay and Rainy River fields. Interviewed by a representative of the *Chronicle* of Port Arthur, he is reported as follows:

What our company would like is for some concern to go into ore producing as a business. There is a great market for iron ore in Ontario, as in this province alone at the present there is a consumption of 500,000 tons per year. The ore now comes almost wholly from the United States. At the present time there is only one firm in Ontario who mines ore for the market.

We would like to get Canadian ore if at all possible. There is not the least doubt that the ore is in this country, and I do not believe that it will be long before Canadian enterprises will be using Canadian ores entirely. The Soo Company would like to purchase all its ore instead of mining it, as the purchasing of mining properties means the tying up of capital which the company would sooner place in its business.

It would, of course, be much to the advantage of Canadian manufacturers of pig iron and steel if there were abundance of good domestic ore available. In the first place, such a resource would operate to check the present steady upward movement in the price of ore. In the second, it would be the means of greatly increasing the iron and steel makers' receipts from the Dominion bounties. These aids are now so much in favor of domestic ore that they are now felt as a strong stimulus to prospecting for iron deposits. Their influence in this character has been increased by the addition of the bounties for the special encouragement of iron and steel making by electrical processes. The latter bounties are restricted to the product of Canadian ores. Though there is no lack of known ore bodies that can be utilized by the electro-thermic makers of iron and steel, there will be a natural preference for such of them as are convenient to water powers, and wherever there is a water power there will tend to be exploration for iron ore. In this quest deposits may be stumbled on in which the ore is much superior to that necessary for electrical treatment. That is to say, the new bounties on electrical iron and steel making account increase the chances of discoveries of high grade ore deposits.

In the nine months' period ending with March the iron and steel bounties paid by the Dominion Government amounted to \$1,190,799, divided as follows:

Pig iron .....	\$385,231
Steel ingots .....	575,259
Puddled iron bars.....	311
Manufactures of steel.....	238,998

The new and increased disparity between the bounties on the products of domestic ore and those of imported ore was by way of concession to a strong feeling in Nova Scotia and in that portion of Ontario west of Lake Superior. In Nova Scotia the chief exponent of a greater preference on the products of domestic ore was the *Halifax Chronicle*, a newspaper of which the Finance Minister was for years the controlling spirit. In New Ontario James Connlee, a strong supporter of the Laurier government, stood also for the giving of the main benefit of the bounty law to the iron and steel made from Canadian ore. A further consideration impelling iron and steel manufacturers to do what they can to accelerate the finding of good iron ore deposits is the improbability that the bounties will be renewed at the end of their present period. Mr. Fielding came very close to saying that he would not again recommend the extension of the bounties. The very general and emphatic protest made against the bounties in the petitions received from agricultural constituencies had probably some effect in the determining of the Minister to make this, if possible, their last lease of life. A compensation, more or less complete, for the expiration of the bounties would be the unearthing of ample deposits of rich ore at Canadian points convenient to iron and steel plants. To promote the discovery of such ore bodies iron and steel manufacturers will naturally do all in their power.

C. A. C. J.



## The Metal Trades Strike Situation.

CINCINNATI, Ohio, July 8, 1907.—The following statement, given out by Acting Commissioner Robert Wuest of the National Metal Trades Association, on the eve of his departure for Boston, is official, and may be accepted as the status of the strike situation at this moment in the metal trades industry:

Some months ago one of the high officials of one of the international unions made the boast that it was the intention of his organization to call a number of strikes in the territory embraced by our association with the view of demonstrating the efficiency of his organization. That this union has done its best is evidenced by the fact that we have recently combatted 83 strikes, but the efficiency of the organization hoped for by our adversaries has developed only in an inverse ratio to their expectations. Our organization has proved equal to all emergencies without any particular effort, and the satisfactory results obtained in the 83 shops proves that membership in the National Metal Trades Association is a valuable asset in time of trouble.

The experience of the members above referred to has demonstrated to them—as it surely should to other manufacturers eligible to membership but not affiliated with us—that as an association we stand for all that is best for both employer and employee by creating the open shop, and should therefore command the special consideration of every broad minded manufacturer. In view of the fact that practically all of the strikes called in the shops of our members have failed in their purpose, and in view of the further fact that these strikes were called, in all probability, for the sole purpose of impressing the rank and file of workmen with the supposed power of union labor organizations, the failure of these strikes should convince the duped followers of the foolish leaders of the absurdity of calling unjust strikes.

It is, however, a hopeful sign that the failure of each strike opens the eyes of a large number of workmen to the folly of belonging to an organization which is antagonistic to the mutual interests of employer and employee.

### St. Louis.

A strike was called in this city May 1 because of the refusal of the members of our St. Louis branch to accord recognition to the local machinists' business agent. This strike involved 18 plants. A corps of competent employment agents was at once sent to various labor centers, with the result that a number of men were secured, whose efficiency, being above the average, shortly placed the affected members in a position to withstand further onslaughts. The former employees of quite a number of the members returned to work on precisely the same terms which existed previous to the calling of the strike. The firmness of the loyal members of our St. Louis branch, as shown in the unyielding resistance to the unjust demands made, has naturally created a fraternal feeling among other manufacturers in the metal trades in St. Louis, the following seven of whom have filed applications for membership with us: Excelsior Tool & Machine Company, Dorris Motor Car Company, St. Louis Screw Company, East St. Louis Locomotive & Machine Shop Company, Fred. J. Swaine Company, Mound City Machine & Pattern Company and Missouri Malleable Iron Company.

### Pittsburgh.

A strike was called in this city April 23, because of the refusal of the members of the Pittsburgh Branch to grant a 50-hour week, a minimum rate of wages of 40 cents per hour, and a 10 per cent. increase in pay. When the leaders realized that their demands were refused, and noted the association's success in securing workmen to take the places vacated by the strikers, they proposed to accept a 10 per cent. increase in pay and say nothing for the time being of the minimum wage or the change in working hours. A large number of the men who so foolishly obeyed the command to strike have returned to work, on identically the same basis as that which prevailed before the strike.

### Cleveland.

The machinists' strike, called in the city of Cleveland, June 3, and which affected nearly 2000 workmen, is now a closed incident, and was a most dismal failure on the part of the union leaders. Thirty plants were involved in the strike, called because of the refusal of employers to grant the establishment of a minimum rate, a 9-hr. day, and a 10 per cent. increase in wages. With the exception of one plant, nearly all are operating with their usual number of workmen—either former employees or new men secured by the association. Three of the plants which especially aroused the labor leaders' animosity have arranged to increase their working force by the addition of a night gang, which would indicate that labor conditions are not so discouraging as to cause anxiety on the part of the those who are striving to maintain the city of Cleveland's enviable reputation as a prosperous, peaceable locality for the successful development of industrial enterprise. The splendid victory achieved in

Cleveland is due, in a large measure, to the unswerving determination of the members of the Cleveland Branch to resist encroachment upon their unquestioned rights.

### Westfield, Mass.

A strike was called in the Westfield factory of the Pope Mfg. Company, because of that company's refusal to discharge an employee whom some of the other employees disliked. The demand was so puerile that the defeat of the strikers was merely a question of a few days' delay. A sufficient number of workmen was secured by the association to put the plant in working condition within a short time from the inception of the trouble, and the manager of the company, in a letter written under date of June 29, states as follows: "We wish to congratulate the officials of the Administrative Council of the National Metal Trades Association for the promptness and vigor with which they handled our case."

### Minneapolis.

On May 1 a strike was called in this city against the Diamond Iron Works, in spite of the fact that, prior to the command to strike, the company had granted its employees both an increase in pay and a 9-hr. day. Having secured so much simply for the asking, the Shop Committee reached the conclusion that the plant could not be successfully managed except under its direction, and hence it objected to the employment of two men, and ordered a strike because of the company's refusal to grant their discharge, with the result that the strike has proved a failure.

### Franklin.

On May 29 a strike was called in the shops of the Chicago Pneumatic Tool Company and the Colburn Machine Tool Company, because of their refusal to establish a minimum rate, recognize the Shop Committee, and agree to other general union conditions. Arrangements were immediately effected by us to secure men to take the places vacated by the strikers, with the result that the strike will unquestionably be of but short duration.

### Toronto, Ontario.

A demand for a 9-hr. day, the establishment of a minimum rate higher than the present pay, and a wage increase having been refused by our members, the Polson Iron Works and the William R. Perrin Company, a number of machinists in the employ of these two companies struck. The places vacated by the strikers are being filled by competent workmen, who are being secured by one of our association's fieldmen.

### Chicago.

One hundred and thirty-five machinists in the employ of our member, the Allis-Chalmers Company, went on strike on May 16, because of the refusal of this company to grant a minimum rate of wages. The strike was given immediate attention by the officials of the Chicago branch, with the result that the managers of the company expressed themselves as well pleased with the efforts of the association's representative.

### Indianapolis.

On June 22 the brass polishers and buffers in the employ of the Keyless Lock Company struck because of the company's refusal to allow them to conduct the department in a manner to suit themselves. The places vacated by the strikers were filled by Monday, June 24, and to safeguard completely the company's interests arrangements were effected to have some work done elsewhere if necessary. On the same date the company informed this office of its complete satisfaction with what had been done by us.

### Scranton.

On June 17 the Scranton Forging Company reported that the employees in its drop forge department had presented a demand embodying the usual routine demands, which it promptly refused. Arrangements are being made to supply the company with operatives to fill the places vacated by the strikers on July 15, at which time the company will be ready to resume operations.

### Association Affairs.

On June 1 J. Philip Bird of the Hobbs Mfg. Company, Worcester, Mass., who was elected by the Boston convention to succeed Charles E. Hildreth as a member of the Administrative Council, presented his resignation because of his severing his connection with the company, having made arrangements to enter a new field of activity. In conformity with section 4 of article 6 of the constitution, President M. H. Barker has submitted to the Administrative Council the name of John R. Back of the F. E. Reed Company, Worcester, Mass., to succeed Mr. Bird.

President Barker has arranged for a meeting of the Executive Committee for July 12.

Speaking of the cost to the association of combating the 83 strikes under discussion, Mr. Wuest noted that it has been much less than has ever been the case heretofore, due, no doubt, to the increased efficiency of the association's staff of field men.

## The Machinery Trade.

NEW YORK, July 10, 1907.

For this season of the year business with machinery houses is holding up very well, and a tendency toward more activity seems to be developing. During the past week many inquiries were received that give promise of the placing of some good sized orders at an early date. While most of the inquiries are for small lots of tools, two of them are of more than ordinary interest, not only because they are of good proportions, but because they cover machinery that will be purchased as soon as the engineers of the respective companies that issued the specifications can come to a decision as to the tools they think best suited for their purposes. The larger of the two inquiries referred to is that issued by the Hudson Companies for a number of air compressors, aggregating \$50,000 in value and machine tool equipment, while the other is from the Utica Drop Forge & Tool Company for machine tools.

There seems to be a special demand for rolling mill equipment and power machinery from some of the smaller rolling mill interests. Most of them have apparently waited with the expectation of getting better prices. Machinery men in that line say that late purchasers have been able to make just as good terms as they could six months ago, as far as deliveries are concerned. Prices have been fairly well maintained. In the power line there appears to be more competition, and as a result of the companies showing some anxiety to get orders, the buyers have been getting satisfactory terms.

A better supply of second hand machinery appears to be in the market than there was even a month ago, and this is attributed to the fact that some of the manufacturers who began making improvements in the beginning of the industrial boom, have replaced old machines with new equipment by this time, and their discards are now on the market. A great deal of the equipment had to undergo some repairs, but much of it is in good shape, and it is declared that those in search of second hand machinery can do better now than they were able to at any time during the last five months.

The Minister of Spain has transmitted to the Bureau of Manufacturers, Washington, copies of the programme of the Exposition of Arts and Industries to be held at Madrid, Spain, in September, October and November. American exhibits are desired, and for those exhibitors who do not wish to visit Madrid or have no representative in the Spanish capital, the Executive Committee will undertake to receive their exhibits, and to see that they are properly shown on suitable stands. The committee will also take care of their interests when the awards are made, and will arrange for repacking and forwarding the goods not sold, for which a moderate fee will be charged.

### Large Inquiry for Air Compressors.

The purchasing department of the Hudson Companies, 111 Broadway, has inquiries out for about \$50,000 worth of air compressors, to be installed in the large terminal in course of construction on Church street from Fulton to Cortlandt streets, New York. This is an indication that the purchasing for that building has been by no means completed, and the trade can look for some good orders from that source within the next few months. The Hudson Companies is placing business with the trade right along, and its present inquiries include at least one hoisting engine for out door service. The purchasing for a building to be erected at Hoboken by the company, which will be 50 x 190 ft., and will be used for storage and repair shop purposes, has not been completed as yet, nor has the buying been done for a small car repair plant to be erected at Jersey City. There is a small list before the trade just now for machinery equipment, which is probably intended for one or the other of these buildings, and other machinery requirements will be out, it is expected, before long.

The Utica Drop Forge & Tool Company, Utica, N. Y., whose plant was recently destroyed by fire, intends to replace at once the old structures with a new saw tooth building, 135 x 275 ft., of slow burning construction. The fire destroyed practically the entire equipment, and the company is now asking prices on tool room and manufacturing equipment, comprising drill presses, lathes, planers, shapers and Lincoln milling machines. No engines are required, as the works are operated by electric power furnished by a local company. A boiler of about 60 hp, for heating purposes is required.

The Rockaway Rolling Mill, Rockaway, N. J., which was mentioned in these columns last week as having inquiries out for rolling mill equipment, is rebuilding its plant which was destroyed by fire on February 21, and the company expects to be operating its new plant some time during October. There is in course of construction a main building, 60 x 214 ft., and additional structures, 70 x 100

ft. and 20 x 150 ft. The buildings are to be of corrugated iron construction. The company is increasing its furnace capacity about 50 per cent. The old mills have been sold, and plans provide for the re-equipping of the plant with the latest up-to-date machinery. The company will install among other things a 13-in. mill, a 10-in. mill and some shears. The company's present power equipment, it is understood, will be adequate to take care of the additions. There has been no change in the affairs of the company, and it will continue to turn out, as before, bar iron for the trade in addition to special test iron.

The Boonton Iron & Steel Company, Boonton, N. J., is purchasing equipment in order to increase its capacity materially. The company has sent specifications to the trade for a 16-in. rolling mill, a 9-in. mill and a 14-in. mill, with the necessary engines. This equipment, it is understood, has been practically decided upon, but it is said there are some power appurtenances and other equipment still to be arranged for.

Some little machinery is required by the National Foundry Company, 32 Sanford street, Brooklyn, N. Y., for equipping the addition to its plant. The company will purchase drill presses, planer, lathe, two 50-hp. electric motors and an electric freight elevator.

The recently organized Ironton Malleable Iron Company, Ironton, Ohio, which is building a new plant with a main building, 120 x 360 ft., has let contract for the steel work, traveling crane, power plant and cleaning apparatus. In addition to these the company will be in the market for molding machines, sand mixers, a drill press, and other equipment usually installed in a modern foundry. Robert R. Barringer is superintendent.

The American Nut & Bolt Fastener Company, Pittsburgh, Pa., has increased its capital stock from \$150,000 to \$200,000. The company has purchased a tract of land at Allegheny, Pa., where it will erect a brick building, with structural steel roof, 80 x 200 ft.

The Astoria Light, Heat & Power Company, 4 Irving place, New York, has planned to build a machine shop at Astoria, I. I., to take care of the general repairs incident to the operation of the company's gas plant. The details have not been determined except in a general way, but the equipment will include a 25-ton crane, some heavy machine tools and equipment for light lathe work. The shop will be about 93 x 155 ft., and it will be divided into two wings. There will be a mezzanine floor on which the lighter machine tools will be placed, and the heavy equipment will occupy the main floor. W. Cullen Morris is the engineer of construction.

The C. Pardee Works, Perth Amboy, N. J., have inquiries out for a 24 x 40 x 30 in. tandem compound rolling mill engine, to replace an engine now in use.

The New York Edison Company will make no announcement as to the size of the power house it is to erect on 201st street, as it is stated that plans have not matured enough to warrant it. The officers of the company admit, however, that the plant will necessarily be a large one, and may vie in size with the Waterside Station which was recently completed. It is stated that the machinery details have not been worked out as yet, and it will be some weeks before the larger part of the buying will be begun, although some of the larger equipment has been practically decided upon. It is probable that by fall the trade will begin to reap the benefit of the company's proposed plant.

The Board of Water Supply, New York, will receive bids until August 6 for the construction of the Ashokan Dam, which, when completed, will be one of the largest in the country. The dam will be about 1000 ft. long, and 196 ft. thick at the base. It will be located near Brown's Station in the Catskills, and will take several years to build.

The Schatt & Morgan Cutlery Company, Titusville, Pa., which is to enlarge its plant, will require considerable new machinery, including polishing and grinding frames, gas engines, dynamos, motors and special cutlery machinery.

## Chicago Machinery Market.

CHICAGO, ILL., July 9, 1907.

The opening week of the second half of the year has been one of pronounced dullness not only in machine tools, but in practically all machinery lines. There is, however, nothing highly significant in this condition, for, save in years of extraordinary trade movement, it is one of expected recurrence that is regularly looked for at this season. The present easement of demand is, perhaps, less unwelcome at this time to both manufacturers and dealers than is generally the case, because of the beneficial effect it is expected to have on future business. It is known that a large amount of machinery requirements has been withheld from the market by reason of unfavorable delivery conditions and other causes incident to the congestion of orders with which factory capacities are now overtaxed. Should the



placing of the new machine tool orders be entirely suspended until September, it would only have the effect, so far as the principal makers are concerned, of bringing deliveries, now from four to eight months distant, two months nearer. This of course is assuming that present bookings shall suffer no reduction through cancellation, and from the disposition now shown in the urgency of demand for shipment such contingencies are extremely remote. If, however, the midsummer slackening results in a decided shortening of delivery dates, it is generally expected that September 1 will witness a sharp revival in buying. Dealers' floors are now better filled than at any time for months past. Though stocks are largely composed of second-hand tools, the proportion of new tools is gradually increasing. The supply of second-hand machines is, perhaps, no greater than heretofore, but a lessened demand is, in a great measure, responsible for the accumulation of stock. Such railroad buying as there is of a purely desultory character, though indications point to an early promulgation of the expected list from the Frisco system.

A feature of the trade in electrical equipment is the activity noticed in municipal plants, both large and small. Extensions of old and the building of new plants figure in these requirements, a number of which are now at the contract stage. Some of these contracts pending, especially those in the Far West and Northwest, involve the use of hydraulic motive power, while other interests of this character are investigating the respective merits of steam turbines and gas engines.

The Barnes Drill Company, Rockford, Ill., is a new addition to the tool manufacturing interests of that city. Its product will be upright drills, gang drills and other machine tools. The officers of the company are: B. F. Barnes, president; D. J. Stewart, vice-president; J. E. Andrews, secretary, and M. A. Love, treasurer. The factory of the new company will be located in the Emerson Mfg. Company's plant recently vacated. A few machine tools, particularly in the pattern making department, have been purchased, but a full equipment of machine tools, small tools, &c., will be required. Motor driven tools will be used throughout the plant, and all large machines will be self-contained. The company is now in the market for this equipment, and solicits catalogues from manufacturers of such tools and machinery as they require.

The Crawford Locomotive & Car Works, Streator, Ill., manufacturer and rebuilder of railroad equipment, is considering a proposition tendered by the city of Galesburg for the removal of its plant to that place. The offer includes a factory site of 50 acres, moving expenses and other considerations. It has not been definitely decided by the company whether it will remove to Galesburg or remain at Streator, but in either event the plant will be largely increased both in buildings and machinery equipment, for which, it is stated, \$250,000 will be expended.

A plant for the manufacture of tinware is being planned by Stuber & Kuck, Peoria, Ill., manufacturers of pieced tinware, cans and specialties. The building will be equipped with two electric elevators, and it is proposed by the company to install an electric generating equipment of sufficient power to furnish current for light as well as for power to operate the plant.

Racine-Sattley Company, Racine, Wis., maker of vehicles and implements, is perfecting plans for a large addition to its farm wagon department, which is now inadequate to meet the demands made upon it. The proposed building will be of reinforced concrete throughout, and will form part of a structure which when completed will be about 100 x 500 ft., six stories and basement. An equipment of automatic sprinklers will be installed, it being the aim of the company to make it as nearly fireproof as is possible.

The city of Jackson, Mo., is asking for bids, to be opened July 9, on the construction of a combined electric light and water plant, and the installation of the necessary mechanical equipment. For the generative and motive power there will be required two horizontal tubular boilers 60 in. by 16 ft., with an open feed water heater of 150-hp. capacity, together with feed pumps and other accessories; one 50 to 60 kw., 60 cycle, 2300 volt generator; one high speed engine 11 x 12 in. cylinder size, designed for operation under 100 lb. per square inch steam pressure, with belt connection to generator. For water service a compound horizontal duplex noncondensing pump to deliver 500,000 gal. of water in 24 hr. against a head pressure of 100 lb. is specified. Lines, poles and all material needed to complete the plant are included in list of requirements on which proposals are invited.

Plans for the improvement of the municipal electric light and water plant of Blakely, Ga., are now under way, and bids are being asked for the machinery equipment. It is proposed to install a 200-kw., three-phase, 60-cycle generator direct connected to either a Corliss or four-valve engine. The transmission will also be overhauled and new

switchboards will be required. While prices are being asked on this equipment at the present time, it will not be until the latter part of the year that work will be actively begun.

## Cleveland Machinery Market.

CLEVELAND, OHIO, July 9, 1907.

The past week has been a satisfactory one to the local machine tool dealers. While their aggregate sales have not been large, they report that their business has been better than it usually is at this time of the year, and better than it was during the greater part of June. There are also quite a number of inquiries coming into the market. These lead the dealers to believe that the demand for tools will keep up fairly good all this month. The demand at present is principally for medium sized tools for additional shop equipment. The sales during the week have been nearly all for single tools. Local dealers still complain that deliveries by the tool manufacturers are scarcely any better, although they are not having so much trouble in replenishing their stocks, as is shown by the slightly increased number of tools on the floors of the storerooms. There is still a good demand for second-hand tools, and no improvement is noted in the supply. Manufacturing plants are still taxed to their fullest capacity to fill their orders, and manufacturers are optimistic regarding future business conditions. Makers of hoisting and conveying machinery report no falling off in the heavy demand. The only industry in this vicinity that seems to have suffered to any serious extent during the past few months is the manufacture of steam shovels. Because of the action of many of the railroads in calling a halt on extension and construction work, the demand for steam shovels has been very light for some time.

The Cleveland Chain & Mfg. Company has been incorporated with a capital stock of \$20,000, by L. D. Round, L. D. Cull, Hannah Round, Albert Skinner and David D. Round, and has acquired a site of several acres along the Pennsylvania Railroad tracks near Garfield Park, where it will begin the erection of a plant as soon as plans can be prepared. The company will manufacture high class machine made chain, including steel loading chain and coil chain. The plant will require considerable special machinery, for which contracts have not yet been let. The machinery will be motor driven. The company has not yet decided whether to put in a power plant or secure its power from a commercial plant. L. D. Round is president, and L. D. Cull secretary-treasurer. The men most actively connected with the company are the leading interests in David Round & Son, manufacturers of chain, chain hoists and hoisting machinery at 7625 Broadway. The two concerns will be run separately.

Through the efforts of the Commercial Club of Springfield, Ohio, the Oscar Lear Automobile Company has decided to move its plant from Columbus, Ohio, to that city. The company will occupy the plant formerly occupied by the American Engineering Company, consisting of a brick office building and a one-story factory building, 60 x 320 ft., and will manufacture commercial trucks as well as pleasure automobiles. The company will have a paid-up capitalization of \$200,000, of which Springfield investors will own one-half. It is expected to have the new plant in operation in from 30 to 60 days. The company now has 110 men in its employ, and when it moves to its new location it will have room to increase its capacity.

The German-American Car Lines Company, Chicago, has commenced the erection of a factory building in Warren, Ohio, for the manufacture of steel flat cars which are to be equipped with tanks. The building will be 50 x 125 ft.

The stove foundry of A. T. Nye & Sons, Marietta, Ohio, which was established in 1828, will be moved to another city as soon as a more suitable location can be selected. The firm desires better railroad facilities than it has at present.

The Columbus Machine Company, Columbus, Ohio, has increased its capital stock from \$150,000 to \$250,000 to take care of its constantly increasing business. The company has been dropping general repair work and concentrating its efforts on gas engines and pipe threading machines. Its engine output has been largely increased.

The Cleveland Tumbling Barrel & Mfg. Company, which was recently formed, will manufacture chaplets and do general machine work in addition to the manufacture of tumbling barrels. The company has equipped its plant at Sixty-fifth street and the Erie tracks with a 30-in. lathe, 30-in. planer, 4-ft. radial drill press and other tools.

The Brown Hoisting Machinery Company reports that the demand for hoisting machinery and locomotive cranes continues very good, and its plant is well filled with orders. The company has just been given a large contract for ore handling machinery and equipment for the new plant of the Jones & Laughlin Steel Company at Allequippa, Pa.



The Republic Belting & Supply Company is sending out a useful souvenir in the shape of a calculator for figuring horsepower, and is receiving calls for them from engineers and millwrights all over the country. One of the calculators will be sent to any one interested in power transmission on application.

## Philadelphia Machinery Market.

PHILADELPHIA, PA., July 9, 1907.

The usual influence of the national holiday was felt by all branches of the machinery trade during the past week. Many plants closed down on Wednesday and remained closed until Monday morning, in many cases to make needed repairs, alterations, &c., which could be made to advantage during the temporary idleness. The volume of business transacted by the trade was therefore not very large. New business was pretty generally deferred, while propositions already under consideration were in many cases postponed for the time. Such business as was transacted was confined largely to the small or medium sized tools, sales of the larger tools being particularly quiet. Inquiries have been only fairly good, but probably a shade more active than during the previous week, the majority of those received being for single tools, principally of the medium sizes. Specifications for two or three small lots of tools were also before the trade, but there has been practically no demand for the heavier standard tools.

Manufacturers and dealers found sales for the month of June fairly satisfactory. In some cases the volume of new business was not fully up to the mark, while in others it would be found that the closing of one or more fair lots early in the month had brought the average up to a good volume.

That new business is diminishing, no one will deny, but the recession appears to be gradual, and thus does not make itself felt to any marked degree. Manufacturers, being pretty well booked ahead, are not worried about the present falling off in new business, as it is expected that orders now on hand, together with the scattered business which comes in from time to time, will be more than enough to keep them fully occupied during the summer months, if not well toward the close of the year. In other cases machine tool builders are already covered for their total production of certain sizes of tools during the remainder of the year, and even beyond that time.

Deliveries on some classes of tools are very much improved, while on others builders make but slightly better delivery dates than was the case some months ago. Special tool builders have probably taken on the greater proportion of new business lately and as a rule are well covered for practically the next six months. On the whole, however, the trade does not expect a very large amount of new business in the summer months, and it is expected that the market will show more or less dullness during July and August.

The foreign demand has been rather quiet, particularly as far as the general line of standard tools are concerned. Some fair business, however, has been done in special tools of both the lighter and medium types. The demand for machinery specialties, power transmission equipment, &c., continues fairly active and is generally satisfactory to the trade.

Second-hand machine tools are not in as good demand as some time ago. The ability to get better deliveries on quite a few of the medium sized tools and even some of the larger ones from both manufacturers as well as machine tool merchants, in addition to the general lack of demand, has had a great deal to do with the quiet condition of this branch of the trade.

The demand for boilers and engines continues fair. Some very good business is under consideration, and orders have been booked for equipment in both the larger and medium horsepower. The outlook for future business in the boiler and engine field, however, both as regards new and second-hand equipment, is scarcely as satisfactory as the trade would like to see.

Foundries, particularly those making gray iron castings, are in some instances reaching out for more work. While enough business is on hand to cover almost the total productive capacities at the time, foundrymen are looking ahead and endeavoring to get contracts for future business. Steel casting plants appear as busy as ever, and, as a rule, have their capacities covered for some time ahead. Machinery castings are reported in better supply, and can now be had for prompt delivery from a number of foundries.

Edward Stern & Co. have had plans prepared by Ballenger & Perrot, engineers, for a modern printing plant at Seventeenth and Vine streets. The building will be 117 x 125 ft., six stories, and will be of the reinforced fireproof construction. A 25,000-gal. sprinkler tank and a 3000-gal. house supply tank will be located in a tank tower. One passenger and two freight elevators and modern toilet and other facilities are to be installed.

The Mummert, Wolf & Dixon Company, Hanover, Pa., which recently succeeded the E. S. Mummert Company of the same place, is placing on the market a new bolt cutter, which is known as the Plurality die bolt cutter. A number of sales of this tool have already been made and the demand is increasing. This company is also manufacturing a revolving oil stone grinding machine, particularly adapted for sharpening knives of woodworking machinery, for which a very satisfactory demand is reported.

The Newton Machine Tool Works, Incorporated, noted some falling off in the volume of business for the month of June, in comparison with the previous month. May, however, was the best month in the history of the concern, and the decline was therefore considered a natural one at this time of the year. During the first six months of this year the business transacted was the largest for any like period. This company has recently completed an addition to its plant, adding a number of new tools.

The Birdsboro Steel Foundry & Machine Company, Birdsboro, Pa., continues to book a good number of orders, although there has been some falling off in inquiries. This company notes the receipt of orders which were held up some time ago and looks forward to a good volume of business during the last half of the year. Recent shipments include several carloads of hydraulic mill machinery into the Pittsburgh District, and large shipments of rough castings are still to be furnished in connection with the same work. Orders for several large 80-in. cotton presses have recently been received. These machines will aggregate shipments of 12 carloads when completed. Orders for high pressure superheated steam fittings of cast steel, for which the company has exceptional facilities for manufacture, have also been booked in quantity. The iron foundry department made a record month during June, shipments of castings being heavier than any previous month in its history.

The Hilles & Jones Company, Wilmington, Del., will change over its old shops to electric drive throughout, and has purchased Bullock motors for the entire equipment. When the new machine shops, recently completed, receive their full equipment of tools, many of which have been delayed in delivery, this company will have a largely increased capacity, and the time required for delivery of punches, shears, bending rolls, &c., will be materially reduced from that required at present. Business keeps up very satisfactorily, and the plant is being operated to its capacity. Among recent orders was one from a large plate mill in Ohio for 10 and 12 ft. plate shears for 1½-in. plates, and a set of straightening rolls for hot work in the same mill. Another recent contract was one for the entire structural outfit for the Kansas City Structural Steel Company, Kansas City, Mo. The company notes an increase in the volume of inquiries, although there appears to be some hesitancy on the part of buyers to close contracts promptly.

## New England Machinery Market.

WORCESTER, MASS., July 9, 1907.

A new and more confident tone characterizes the machine tool market. The week with the dealers has been a good one, but nothing exceptional as compared with other weeks of recent months. But a sense of optimism has come over the trade, instead of the condition of doubt which has prevailed in expressed opinions of late. It is not altogether easy to tell why this change has come over the situation; to understand just what influences have been at work, yet it is very noticeable in the comments of dealers and especially of manufacturers. The feeling has become pronounced that the autumn will see a pronounced increase in business. A difference has been noted by machine tool builders in the number of inquiries pointing to fall orders, and orders have been received in more satisfactory volume than for a few weeks back. There seems to be a better realization of the fact that the falling off in business has been in reality very slight. The trouble has been in the existence of doubt as to what the future would bring. Men have looked askance at the crops, the pig iron market, the effects of governmental prosecution of railroads and other great corporate interests, until a certain kind of nervousness was engendered. It now looks as if this had largely disappeared.

The whole consideration of the condition of the machinery market is on new and future business. Every machine tool builder has enough orders on his books to keep him busy for a considerable time to come, even if no new business should be received. No cancellations have been reported, with the single exception of a large German order, aggregating close to \$50,000, it is said, and this was some time ago, and was well distributed. Consequently there seems to be no reason to expect cancellations, for if they were to be received it would have been before this, it is believed. So the business on the books of the manufacturers may be considered as there to stay, and the question

resolves itself into whether orders will continue to arrive in sufficient volume to maintain deliveries as they are, and, if not, whether there will be a revival of business in the autumn sufficient to stop the catching up process. At present some works are gaining on their orders, generally where the types of tools manufactured are those which have been less difficult to obtain during the year past, rather than with those the absence of which from the market has been keenly felt. Delivery sheets prove that this gain is being made. Other establishments are unable to make much if any impression upon existing conditions of shipment. Few if any are going backward in this respect. So on the average there is a gain. But it would take comparatively little acceleration of demand to put the market where it was last winter, and in some respects it would be worse than ever in its deliveries. And, to repeat what has been pointed out in this column, it must be taken into consideration in making a comparison of demand that the production of machine tools has been constantly and rapidly increasing in volume for a year or more. Some works have practically doubled their output. One New England company did as much business in the first six months of 1907 as it did in the whole of 1906. Another, a younger house, which did a substantial business in 1906, shows an even greater ratio of increase this year. Every one has grown some, and few have not increased capacity by at least 25 per cent. And all are unable to make much impression upon their deliveries.

Placing the complaints of business made by dealers during the past few months beside their totals of business actually transacted during the same period constitutes an interesting contrast. One Boston house did between 5 and 10 per cent. more business up to July 1 than it did in the corresponding months of 1906. Others have had similar experiences, though probably the average would not show so high a rate of increase. This all goes to prove the fact that both manufacturers and dealers have had so prosperous a period of business that their accepted standard of what they should be able to do has gone higher and higher, until it is very high indeed.

The week has shown nothing sensational in the way of business. It is reported in Boston that the New York Central has bought the large list of equipment for the extensions of its repair shops at West Springfield, Mass., on its Boston & Albany division. Some very good orders have been booked, but most sales have been for small lots and a single tool here and there. Occasionally a new industry is starting, which requires its initial equipment, but most such concerns have already placed their business.

The foundries of New England are apparently as rushed as ever, and this is true of all branches of the business, including malleable iron and brass and composition metal.

The boiler trade is interested in the appointment of what will be known as the Board of Boiler Rules, which will formulate rules for the construction, installation and inspection of steam boilers in Massachusetts. The boiler manufacturers express themselves as very well satisfied with the law under which the board is created. They anticipate that the rules will have an important effect upon the business, in that the use of the "lap seam" boiler will be strictly defined in new work, and the probability is that some new business will be created through condemnation of existing boilers and radical changes in the safety valve and other appurtenances of the boiler room.

The Worcester Fire Extinguisher Company, Worcester, Mass., manufacturer of fire sprinkler systems, is to extend its works by the erection of a one-story brick addition, 40 x 60 ft. The company will increase its machine equipment and will be in the market for either one or two boring mills of small size and some other machine tools, the list of which is not yet ready.

Hiram Percy Maxim, designing engineer for the Electric Vehicle Company, Hartford, Conn., is to resign, with the intention of organizing a company for the manufacture of automobiles, with works at Hartford, according to a dispatch from that city. It is said that he will be backed by Hartford and New York capital. His plans include the building of electric vehicles in the beginning and a line of gasoline cars later on. Mr. Maxim has been with the Electric Vehicle Company for a number of years, excepting two years, during which, he was with the Westinghouse Electric & Mfg. Company, at Pittsburgh. Details of manufacturing plans are not yet ready.

The International Oil Engine Company, Danielson, Conn., manufacturer of kerosene combustion engines, states that it has booked orders for 4000 engines, many of which will be shipped to China and the Philippine Islands.

The North & Pfeiffer Mfg. Company, New Britain, Conn., manufacturer of automobile specialties, piano player hardware, spring motors and boot calks, is to build a three-story addition to its factory, 38 x 46 ft. The company states that it will increase its machine equipment in the near future, particularly in the way of screw machines, and would be glad to receive catalogues for its file.

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## Government Purchases.

WASHINGTON, D. C., July 9, 1907.

The Isthmian Canal Commission will receive bids until July 22, circular No. 375, for a helve hammer and other supplies.

The constructing quartermaster of the army, Washington, D. C., will receive bids until July 30 for one 10-ton, six-wheel locomotive, two-passenger cars and one double truck flat car for use at Fortress Monroe, Va.

The following bids were opened June 27, circular No. 371, for supplies for the Isthmian Canal Commission:

Bidders 7, the Commercial Electric Supply Company, St. Louis, Mo.; 11, D'Olier Engineering Company, Philadelphia, Pa.; 20, General Electric Company, Schenectady, N. Y.; 27, International Electric & Engineering Company, New York; 33, Manning, Maxwell & Moore, New York; 36, Motley, Green & Co., New York; 38, Northern Electric Mfg. Company, Madison, Wis.; 47, Sprague Electric Company, New York; 49, B. F. Sturtevant Company, Hyde Park, Mass.; 51, Western Electric Company, New York; 52, Westinghouse Electric & Mfg. Co., Baltimore, Md.; 54, George S. Fowler, Washington, D. C.

Class 18. Three dynamos and engines—Bidder 7, \$1740, no time; 11, \$1920, 100 days; 20, \$1977, 105 days, and \$2241, 62 days; 27, \$1989, 60 days; 33, \$1860, 90 days; 36, \$892.50, 75 days; 38, \$1800, 130 days; 47, \$1620, 70 days; 49, \$1818, 100 days; 51, \$1618.50, 60 days; 52, \$1555 and \$1950, 100 days; 54, \$2475, 125 days.

The following bids were opened June 28, circular No. 369, for suction dredges for the Isthmian Canal Commission:

Atlantic Equipment Company, New York, two dredges delivered alongside vessel, New York City, for \$236,500; the first dredge is to be delivered within 320 days, the second dredge within 410 days.

Bucyrus Company, South Milwaukee, Wis., one or two dredges, delivery New York, in accordance with specifications, one dredge within 235 days, at \$98,800; for two dredges delivered within 260 days, \$191,800; if machinery is delivered on board ship there will be an extra charge of \$550 in the case of each dredge.

Carr Bros., agents for Lobnitz & Co., New York, for two dredges delivered, c.i.f. New York, within 250 days, \$188,560; lighterage and custom duties, if any are imposed, are not included in this price.

Maryland Steel Company, Sparrows Point, Md., for two dredges in accordance with specifications, loaded on cars or on vessels at any Atlantic port within 195 days, \$173,500; shipment of hull can be made in 150 days and the dredge completed and shipped in 195 days.

Merrill Stevens Company, Jacksonville, Fla., one dredge delivered at Jacksonville, Fla., within 240 days, for \$99,800.

Moran Company, Seattle, Wash., one dredge delivered at Seattle, Wash., within 240 days, for \$133,000.

Newport News Shipbuilding & Dry Dock Company, New York, two dredges delivered at Newport News, Va., the first one within 270 days, the other within 300 days, at \$165,000.

Bids were opened June 28 by the chief signal officer of the army for furnishing one motor generator and switchboard, as follows:

Crocker-Wheeler Company, Ampere, N. J., generator, \$4715; switchboard, \$715.

General Electric Company, Schenectady, N. Y., \$6669 or \$6100 complete.

Westinghouse Electric & Mfg. Company, Baltimore, Md., \$6274.

Bids for furnishing one alternating current generator were opened June 28 by the chief signal officer of the army, as follows:

Roth Bros. & Co., Chicago, Ill., \$543.

Fort Wayne Electric Company, Fort Wayne, Ind., \$395.

The following awards have been made for supplies for the navy yards, bids for which were opened June 25:

Henshaw, Bulkeley & Co., San Francisco, Cal., class 21, one hand power brake, \$480; class 22, one ring and circle shears, \$448; class 23, one bottom flanging machine, \$472.

Niles-Bement-Pond Company, New York, class 111, one vertical drill press, \$139.

Frevert Machinery Company, class 112, one pipe threading and cutting machine, \$434; class 133, one knife grinding machine, \$318; class 147, one band saw, \$369; class 306, one motor driven polishing machine, \$214.

Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., class 132, one electric motor, \$237.

Atlantic Works, Philadelphia, Pa., class 134, one band saw sharpener, \$170; class 138, one dimension planer, \$3200; class 139, one matcher and deck planer, \$1900; class 140, one heavy timber planer, \$7700.

Mattheson Mfg. Company, Chicago, Ill., class 135, one circular saw sharpener, \$158.50.

Detrick & Harvey Machine Company, Baltimore, Md., class 136, one hand saw setting and filling machine, \$100.

American Wood Working Machinery Company, Rochester, N. Y., class 137, one mortiser and borer, \$580; class

141, one hand planer and joiner, \$447; class 145, one combination saw and dado machine, \$506.

Greenlee Brothers & Co., Chicago, Ill., class 143, one single automatic cut off saw, \$1055.

Oliver Machinery Company, New York, class 144, one double cylinder sawing machine, \$570; class 457, one pattern makers' extension gap lathe, \$1241.

J. A. Fay & Egan Company, New York, class 146, one band saw mill, \$6934; class 148, one band scroll and resaw machine, \$1350; class 150, one automatic blind style mortising and boring machine, \$465; class 151, one tenoning machine, \$615.

Rockwell Engineering Company, New York, class 161, one plate heating furnace, \$10,789.

Prentiss Tool & Supply Company, New York, class 302, two rotary drills, \$80.

Chicago Pneumatic Company, New York, class 304, 24 pneumatic drills, \$1260.

Columbus Pneumatic Tool Company, Columbus, Ohio, class 305, 12 pneumatic hammers, \$369.

General Electric Company, Schenectady, N. Y., class 431, four turret turning equipments, with motors and spare parts, \$13,384.

Under bids opened June 18 for machinery for the navy yards, the following awards have been made:

Landis Machine Company, Waynesboro, Pa., class 31, one threading and tapping machine, \$1300.

R. H. & F. M. Roots Company, New York, class 32, one rotary blower and motor, \$2194.

Garvin Machine Company, New York, class 41, one extension gap lathe, \$214.82.

Manning, Maxwell & Moore, New York, class 42, one screw cutting, back geared engine lathe, \$882.

Niles-Bement-Pond Company, New York, class 43, one column shaping machine, \$840; class 45, one power feed drill press, \$293.

Fairbanks Company, New York, class 44, one sensitive drill, \$112.

Frevert Machinery Company, New York, class 46, one emery grinder, \$334.

Under bids opened June 4, circular No. 367, for machinery for the Isthmian Canal Commission, the following awards have been made:

Niles-Bement-Pond Company, New York, class 1, one screw cutting engine lathe, \$3650; class 2, one screw cutting engine lathe, \$1100; class 3, one screw cutting engine lathe, \$500.

Motley, Green & Co., New York, class 4, one universal milling machine, \$1235.

Fairbanks Company, New York, class 5, one upright sliding head drill press, \$515.

William Sellers & Co., Philadelphia, Pa., class 6, one parallel driven planer, \$2630; class 7, one slotting machine, \$2335.

Manning, Maxwell & Moore, New York, class 8, one traveling head shaping machine, \$1729.

Under bids opened May 28 for supplies for the navy yards, Manning, Maxwell & Moore, New York, have been awarded class 301, eight engine lathes, \$8280.

Under bids opened May 14 for supplies for the navy yards, the Craig-Ridgeway & Sons Company, Coatesville, Pa., has been awarded class 431, one air hydraulic balance jib foundry crane, \$1300.

The following awards have been made for supplies for the Isthmian Canal Commission, bids for which were opened May 17, circular No. 363:

Hallidie Machinery Company, Seattle, Wash., class 6, two sliding head drill presses, \$657.70.

Manning, Maxwell & Moore, New York, class 10, one milling machine, \$1325.76; class 20, one engine lathe, \$2831.53; class 24, one tool room engine lathe, \$765.48.

Motley, Green & Co., New York, class 12, one hand milling machine, \$199.

Jones & Lamson Machine Company, Springfield, Vt., class 26, one turret lathe, \$1750.

The following awards have been made for supplies for the navy yards, bids for which were opened June 11:

Quincy-Manchester-Sargent Company, New York, class 4, one foundry cold saw, \$1721.30.

Harron-Rickard & McCone, San Francisco, Cal., class 14, one planer, \$3288.

American Wood Working Machinery Company, Rochester, N. Y., class 16, one band resaw, \$1700.

Alfred Box & Co., Philadelphia, Pa., class 177, one electric traveling crane, \$4186.

Oliver Machinery Company, New York, class 188, one hand planer and joiner, \$618.

Fairbanks Company, New York, class 189, one high duty shaper, \$1575; class 190, one universal cutter and tool grinder, \$425; class 193, one friction driven sensitive drill, \$130.

Frevert Machinery Company, New York, class 191, one water tool grinder, \$278.

Manning, Maxwell & Moore, New York, class 192, one standard radial drill, \$965.

Hendey Machine Company, Torrington, Conn., class 194,



one engine lathe, \$1090; class 195, one screw cutting engine lathe, \$827.

Niles-Bement-Pond Company, New York, class 196, two change gear screw cutting engine lathes, \$4615; class 197, two change gear screw cutting engine lathes, \$2448.

Bullard Machine Tool Company, Bridgeport, Conn., class 198, one standard boring and turning mill, \$3106.

The Wetherill Brothers Machine Company, Chester, Pa., has been awarded contract for the construction of a 10-in. hydraulic dredge for use in the Dalecarlia Reservoir, Washington, at \$26,400.

Harron, Rickard & McCone, San Francisco, Cal., have been awarded contract for two 30-hp. boilers for the fog signal station at Lime Point, Cal., at \$1342.

**Catalogues Wanted.**—The Weston Engineering Company, 39 Wall street, New York, desires to receive catalogues of smoke consuming devices.

## Trade Publications.

**Crank Shapers.**—R. A. Kelley Company, Xenia, Ohio. Catalogue. Pertains to the company's exclusive specialty, crank shapers. Illustrations and descriptions are given of the 15, 17, and 20-in. single-gear crank shapers, and the 16, 20, 24, and 26-in. back-gear shapers, preceded by a résumé of the advantages of crank shapers.

**Pumping Machinery.**—Epping-Carpenter Company, Pittsburgh, Pa. Catalogue. Size, 6 x 9 in.; pages, 78. Deals with pumping and condensing machinery, including steam pumps, boiler feed pumps, piston pumps, fire pumps, bilge pumps, plunger pumps, compound and triple expansion pressure pumps, jet condensers, independent condensing apparatus and surface condensers, vacuum pumps, feed pumps and receivers, air pumps, artesian well and deep well pumps, &c. Dimensions, useful information, and a complete index are included.

**Controllers.**—Electric Controller & Supply Company, Cleveland, Ohio. Bulletin No 107. Pertains to the type G controllers for electric cranes and other motor-driven machinery, which have been designed to meet the demand for moderate priced self-contained controllers of from 1 to 50 hp. capacity. These controllers were described in *The Iron Age* February 28, 1907.

**Car Replacers.**—Alexander Car Replacer Mfg. Company, Scranton, Pa. Pamphlet. Devoted to the Alexander pressed steel engine and car replacer, giving numerous testimonial letters, and an alphabetical list of railroad and coal companies that are using them.

**Engines.**—Lane & Bodley Company, Cincinnati, Ohio. Bulletin No. 101. Describes and gives the advantages of the company's four-valve shaft governor engines, particularly in the driving of relatively high speed direct-connected electric generators. A table of code words and dimensions is given.

**Ejectors and Valves.**—Tranter Mfg. Company, Pittsburgh, Pa. Two circulars. One presents jet pumps, ejectors and siphons, including Coll's patent Defiance pump; the McKnight patent pump; Coll's patent ejector; Sherriff's patent pump, and the McFeely jet pump. The other circular is devoted to the Robertson blow-off valve, the valve and seat of which can be removed and renewed without disconnecting either inlet or outlet connections.

**Spiral Riveted Pipe, Boilers, &c.**—Abendroth & Root Mfg. Company, Newburgh, N. Y. Hand-book No. 39. Size, 4½ x 7½ in.; pages, 127. Deals with Root spiral riveted pipe and Root water tube boilers. The making of the spiral pipe is clearly described, and illustrations show steps in the manufacture, and the asphalted, galvanized and plain black pipes and also the methods of jointing. Price-lists are given. The Root water tube boilers are described and illustrated, and their parts are dealt with separately. Directions for erecting the large and small drum type boilers, instructions for operating Root water boilers, testimonial letters, list of repairs for metal and rubber packed boilers, tables of weights and dimensions, and other general information are included. Among the other products of the company shown in this booklet are cast iron flanged fittings, valves, sheet iron and plate metal work, punched and formed sheets, riveting tools, gravel elevators, hydraulic giants, exhaust heads, strainers, bilge pumps and repairs, and the Frontenac touring car, which this company has placed on the market.

**Motors.**—Emerson Electric Mfg. Company, St. Louis, Mo. Thirteen bulletins, 3100, 3111-3122, inclusive. Pertain to small induction motors for single-phase current, having capacities from 1-40 to ½ hp., which are made with large frames, suited for continuous service under full rated load, and in condensed frames, designed for compactness, for use where space is limited. Some frames are entirely inclosed to protect the motors from dirt and dust; others have open housings, permitting free circulation of air, and some frames have shutters that may be readily attached to close the openings in the housings. The motors are also made in light and full load

starting types; the light load automatic start type is intended for service where the load at starting is not a large per cent. of the load at full speed, and the full load automatic start type is provided with an internal clutch which enables the motor to start promptly under full rated load. Most of these bulletins supersede previous issues. Pocket price book No. 9, superseding No. 8, gives net prices to the trade only of Emerson motors and motor applications described in these bulletins.

**Hydraulic Jacks.**—Richard Dudgeon, Broome and Columbia streets, New York City. Catalogue. Treats historically of the hydraulic jack, of which Richard Dudgeon was the original inventor; describes and illustrates the different types which marked epochs in the development of the present form—the Universal—and fully discusses the construction, operation, and advantages of the latter. An illustrated description of this latest Dudgeon hydraulic jack was given in *The Iron Age* January 3, 1907. The jacks are built with three different types of bases, and in sizes having lifting capacities of from 30 to 60 tons. Tables of prices, dimensions and code words, and a list of the component parts of the Universal Jack are given.

**Hydraulic Machinery.**—Waterbury Farrel Foundry and Machine Company, Waterbury, Conn. Catalogue, section H. Size, 6 x 9 in.; pages, 142. Deals with a line of hydraulic machinery, including embossing presses, cabbaging machines, pipe testers, automatic drawing presses, vertical drawing presses, horizontal push, pull and draw benches, accumulators, accumulators and pumps mounted together, power pumps, forging machines, special machines and valves. A complete index is given.

**Indicating Instruments.**—Sargent Steam Meter Company, First National Bank Building, Chicago, Ill. Folder. Refers briefly to the company's dust determinator, steam and compressed air meters, automatic gas calorimeter, indicating anglemeter, integrating dynamometer and draft gauge.

**Drilling, Boring and Tapping Machinery.**—Baker Brothers, Toledo, Ohio. Catalogue No. 5-B. Devoted to a line of drilling, boring and tapping machinery, including drills with 12, 16 and 20 in. spindle feed; high speed drills, 4, 7, 10 and 16 in.; tapping machines; a small air compressor for operating a pneumatic automatic belt shifter; 10, 18 and 24 in. flange chucks; 4, 7, 10 and 12 in. fitting chucks; facing heads for facing pipe flanges, and cylinder, automobile crank-case, car wheel and locomotive rod boring machines.

**Pyrometer.**—Charles Engelhard, 41 Cortlandt street, New York. Catalogue. Deals with the Heraeus Le Chatellier pyrometer for measuring temperatures between zero and 1600 degrees C., or up to 2920 degrees F. Numerous testimonial letters are given concerning this pyrometer and several pages of useful information are included.

**Electric Resistances.**—Cutler-Hammer Mfg. Company, Milwaukee, Wis. Pamphlet. This is entitled "A Tale of Two Types," and is a candid comparison of ventilated and inclosed resistances, both of which types are made by the company. Its purpose is to acquaint the users of starting rheostats with the relative merits and demerits of the two types. Included in this pamphlet are the rules and regulations of the National Board of Underwriters relating to the installation and construction of rheostats.

**Vises.**—Pittsburgh Automatic Vise & Tool Company, Pittsburgh, Pa. Catalogue. Entitled "The Pittsburgh Two-Way Vises." Describes and illustrates in full the latest in vise construction, in particular the high speed bench vise.

Machinists employed in some of the principal shops of Fitchburg, Mass., went on strike July 8, because of the refusal of their employers to grant the demands of the local lodge of the Machinists' Union, which involve the recognition of the union, a 55-hour week and the usual union rules as to overtime, apprentices and other minor questions. The works affected are those of the Putnam Machine Company, Fitchburg Machine Works and Bath Grinder Company, manufacturers of machine tools; the C. H. Brown Engine Company and Fitchburg Steam Engine Company, builders of stationary engines, and the C. H. Cowdry Machine Company. Less than one-half of the employees of these companies, in varying proportions in the different shops are included in the strike, about 250 men going out and 280 remaining at work. The matter of wages is entirely secondary in this instance, recent advances having been entirely satisfactory to the men. In minor details the demand resembles that made recently by the union at Providence, R. I., which was given in detail in *The Iron Age* of May 23. The employers propose to fill the places of the strikers, excepting as they may be taken back as individuals, and not as members of a union. The affected shops are members of the Worcester branch, National Metal Trades Association, which body will act its customary part in cases of the sort.

# HARDWARE

WE have received several letters from manufacturers touching upon the attitude taken by some Hardware merchants in regard to the advertising of Hardware goods to the public generally through the medium of popular newspapers and magazines. These letters without exception refer to the Boston meeting of the National Retail Association and the opposition there expressed to such advertising. While this opposition was of sufficient importance to justify our alluding to it in our last issue, it is easy to exaggerate the significance of the disapproval thus voiced, and it would be unfair to the retail merchants of the country to take what was said at Boston as indicating the attitude of the retail merchants generally on this subject.

It must be remembered in this connection that the gathering at Boston was not one for the determining of such questions. So far as association work is concerned, its deliberations would be of marked significance and its deliverances would have weight with the various State associations which sent delegates to it. The convention, however, had no authority, possessed by inherent right or conferred upon it by the State associations, to pass upon any of the general questions relating to the methods, the principles or the practices of merchants or manufacturers in carrying on the Hardware business. The National Association, in convention assembled, would have no right to attempt to settle the question as to the best methods of sampling Pocket Knives, the privilege of retail merchants to do something of a jobbing business, the wisdom or the unwisdom of the jobbers in remunerating their salesmen according to the profits realized on their sales, the disposition on the part of retail merchants, as their business increases, to buy more and more from the manufacturers. With these and a hundred other trade subjects, among which that of publicity advertising is one, the National Association has as an association no authority and is not supposed to represent the trade in determining such questions.

The manufacturers, therefore, err in taking too seriously what was said at the Boston meeting in regard to the popular advertising in which some prominent Hardware houses are experimenting. Even if there had been a definite deliverance against it they would not be justified in accepting such deliverance as expressive of the opinion or judgment of the Hardware merchants on the question. The intelligent merchants of the country would not, and could not wisely or with self respect, surrender their judgment to the dictation of the able and influential members of the National Association, which, indeed, makes no claim to authority in such matters.

It would be a mistake to assume that the Boston convention put the seal of its condemnation on the popular advertising under discussion. There was, so far as we can learn, no resolution adopted disapproving of it. There was simply a paper by one of the delegates on the subject, followed by a discussion in which opinions on various phases of the matter were expressed. The paper was indeed an argument against publicity advertising in Hardware, but was simply the expression of individual opinion, and many of the comments made upon it were of similar tone. There were, however, delegates who maintained the advantage to the trade of such advertising. The association wisely refrained from putting itself on

record on the question. This was perhaps because the desultory debate did not lead to a conclusion, or because there was a decided difference of opinion among the delegates, or because the association recognized that it had no business to legislate on the subject. In view of this state of things manufacturers need not be disquieted because in an assembly of something less than 100 merchants a few were found who expressed themselves in opposition to the popular advertising in which some manufacturers are indulging.

The general tenor of the discussion at Boston was, however, adverse to the popular advertising of Hardware products. This may be because the debate was left largely to those in opposition, the discussion drifting, as discussions sometimes will, with only a partial and one sided consideration of the subject. The practical question remains as to what retail merchants generally think of such advertising. It is evident that some look on it with little favor: a few apparently think it helps them; but it would seem that the great mass are indifferent to it, finding little benefit and as little detriment resulting from it. Such advertising has not as yet any very decided effect on the trade, and the advantages and disadvantages of it, taking a broad view of the various interests concerned, remain to be determined. The manufacturers should certainly be allowed to find a market in this way if they can do so successfully. If such advertising is advantageous to retail merchants, there will be in this fact a strong argument in its favor. If, on the other hand, retail merchants should disapprove of it or fail to find it helpful in increasing their sales, this would count against it. It is a question which will, as it were, settle itself. Merchants need not greatly concern themselves with it, except as they endeavor to take advantage of any opportunities afforded them. The manufacturers, each for himself, will decide whether or not such advertising pays. If it pays it will be continued; if it does not pay it will be given up.

## Condition of Trade.

With the coming of midsummer and the greater or less interruption of business caused by the vacation season there is less engrossing attention being given to the active marketing of goods, and houses are as a rule content to take care of current trade without special efforts to extend it. Many manufacturing plants are devoting part at least of this month to repairs, making good the wear and tear resulting from the heavy pressure under which they have been operated. Many of them are availing themselves of the opportunity for making improvements, and there are many cases in which there will be an enlargement of capacity by the extension of their plants and the addition of new machinery. Many of the factories, however, still have unexecuted orders on their books, and there is little disposition to disturb much their producing facilities. The prevalence of summer weather, which is decidedly favorable for the crops, induces a hopeful feeling in regard to the results of the harvest, notwithstanding the fact that some sections will have to accept a yield less than that of the recent exceptionally good years. While the market for raw material does not show special strength and some declines in price are to be noted, there is apparently in Hardware

circles an increase in confidence that the season's business will be of excellent volume. Not a few manufacturers report the purchasing by the larger trade to be on more conservative lines than has been usual during the past year or two, but on the whole there is little ground for complaint in regard to the volume of current purchases.

### Chicago.

With a strong feeling of confidence in abiding prosperity permeating all strata of the consuming community and a purchasing power seemingly unimpaired, there is every reason to expect a satisfactory outcome of business through the second half of the year. No marked change is observed in any direction save that in most of the Hardware lines, as elsewhere, there has been a gradual slackening in demand with the approach of the midsummer season. Whether the softening influences responsible for the quieter trend in trade movements at this time will extend beyond seasonable limits cannot be definitely foretold; but there are now no indications apparent pointing to such a result. Underlying and supporting commercial stability in every branch of trade is a spirit of sane, calm confidence that in the face of panicky stock markets, crop failure reports, and other disturbing conditions, stands unshaken. The prevalence of such an attitude augurs well for the future. A noticeable feature of the Lawn Mower trade is the strong tendency of demand toward machines of the better grades. These have sold well throughout the season, while stocks of cheaper machines have moved slowly. Second orders, which on account of the backward season have been delayed, are now coming forward, though not in the volume anticipated. Hay crop prospects, which are almost universally good, have stimulated the demand for Hay Tools and a very satisfactory business is reported by both manufacturers and jobbers. Bale Ties, on the other hand, are quiet. Large hay crops do not necessarily imply an active demand for Bale Ties. On the contrary, short crops and high prices often result in a larger percentage of baling and the consequent use of more Ties. Several makers have announced advances of \$3 per dozen on Washing Machines. Other advances are talked of, but none of special importance seems to be assured. Slowly the Wire Nail situation is improving, though deliveries of Barb Wire are not materially better. All things considered, 1907 bids fair to be, if not a banner year, a very satisfactory one from all points of view.

### NOTES ON PRICES.

**Wire Nails.**—The demand continues heavy, and there appears to be little reason to expect a falling off in requirements during the remainder of the summer. The mills are experiencing difficulty in obtaining steel and are several weeks behind orders. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$2.00
Carload lots, to retail merchants.....	2.05

**New York.**—It is difficult for local jobbers to keep stocks fully assorted, both on account of tardy mill shipments and a good demand. The local market is fairly well maintained, except that sometimes Hardware jobbers sell Nails at less than regular quotations to influence the sale of other goods. New York Jobbers' quotations are: To retailers, carloads, on dock, \$2.19; less than carloads, on dock, \$2.33; small lots at store, \$2.30.

**Chicago.**—A strong demand, that now bids fair to extend into the fall buying season, is the dominant feature of the market. It looks as though there would be no interim between spring and fall buying this season. No stock has been accumulated by the mills to take care of this trade, as is usually the case. Quotations are as follows: \$2.18 in car lots to jobbers and \$2.23 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

**Pittsburgh.**—Demand continues very heavy and mills are still several weeks behind in deliveries. They have

been much hampered by lack of steel. The Carnegie Steel Company has decided to operate its Ohio Works, at Youngstown, exclusively on Billets during the present quarter. During the first half of the year this mill has been turning out a fairly large tonnage of rails and sheet bars, alternately, in addition to the tonnage of Billets which is made regularly, and the increased Billet output will go largely to the Wire mills. There is no prospect of any decrease in the demand for Nails during the summer. Some of the mills are looking for a general market advance in the near future. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$2.00
Carload lots, to retail merchants.....	2.05

**Cut Nails.**—A moderate demand exists for Cut Nails, and, while supply is somewhat restricted by the temporary shutting down of mills, shipments on new business are being made promptly. Some mills make concessions on regular quotations. Quotations are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, \$2.05; less than carloads, to jobbers, \$2.10; less than carloads, to retailers, \$2.20. Iron Cut Nails at points west of and including Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

**New York.**—The demand is fair and in about the usual proportion to that of Wire Nails. The market is generally maintained, but jobbers of Hardware sometimes sell small lots of Nails at less than jobbers' regular quotations to secure business in other lines. New York jobbers' quotations are on the basis of \$2.30.

**Chicago.**—The Cut Nail demand while not on a par with that of Wire Nails is fairly good and prices are now steady. The supply has been curtailed somewhat by temporary mill shutdowns, but stocks are well supplied. Quotations are as follows: Iron Cut Nails, car lots, to jobbers, \$2.33; to retailers, \$2.38; Steel, to jobbers, in car lots, \$2.33; to retailers, \$2.28.

**Pittsburgh.**—There is no particularly heavy demand for Cut Nails, but the market is fairly firm, concessions being made only occasionally. Regular quotations are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, \$2.05; less than carloads, to jobbers, \$2.10; less than carloads, to retailers, \$2.20. Iron Cut Nails at points west of and including Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

**Barb Wire.**—Some delay is experienced in receiving prompt shipments from mills on contract specifications. There is a restricted volume of new business coming to the mills. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots.....	Painted.	Gal.
Retailers, carload lots.....	\$2.15	\$2.45
Retailers, less than carload lots.....	2.20	2.50
	2.30	2.60

**Chicago.**—Specifications on contract are still coming forward, and mills have not reached a point in clearance of back orders that enables them to make normally prompt shipments. Some new business is noted, but in decreased volume. We quote as follows: Jobbers, Chicago, car lots, Painted, \$2.33; Galvanized, \$2.63; to retailers, car lots, Painted, \$2.38; Galvanized, \$2.68; retailers, less than car lots, Painted, \$2.50; Galvanized, \$2.80; Staples, Bright, in car lots, \$2.30; Galvanized, \$2.60; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

**Pittsburgh.**—There is not much new business going, but specifications continue very satisfactory. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots.....	Painted.	Gal.
Retailers, carload lots.....	\$2.15	\$2.45
Retailers, less than carload lots.....	2.20	2.50
	2.30	2.60

**Smooth Fence Wire.**—A fair amount of new business is coming to the mills, and specifications on contract orders continue heavy. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:





	STANDARD											EXTRA HEAVY										
	2"	3"	4"	5"	6"	7"	8"	10"	12"	15"	2"	3"	4"	5"	6"	7"	8"	10"	12"			
Trap Covers	15	20	25	40	50	75	90		1 55		22	32	40	50	65	90	1 05		1 85			
Long T, San. T or TV, V & Y Branches 18" clear	1 65	2 55	3 50	4 75	6 75						2 45	3 65	5 35	7 10	8 75							
" " " " " " " " " " " "	2 05		4 25	5 75	7 75						2 95		6 10	8 10	9 75							
" " " " " " " " " " " "		4 05	5 00	6 75	8 75							5 35	6 85	9 10	10 75							
" " " " " " " " " " " "			5 75	7 75	9 75								7 60	10 10	11 75							
Double Angle Y Branch, 4" Branches only			3 50	4 50	5 75								4 50	5 75	7 25							
Special Reducing Sanitary T & Y Branches			2 10	2 75	4 25								2 90	3 95	5 40							
SIZES	2x2	3x3	3x2	4x4	4x3	4x2	5x5	5x4	5x3	5x2	6x6	6x5	6x4	6x3	6x2	7" and Larger SIZES	8" and Larger SIZES	10" and Larger SIZES	12" and Larger SIZES			
T, Sanitary T or TV & Y Branches Standard	70	1 25	1 25	1 75	1 75	1 75	2 25	2 25	2 25	2 25	3 50	3 50	3 50	3 50	3 50	5 00	6 00	10 00	14 00			
Extra Heavy	1 00	1 65	1 65	2 40	2 40	2 40	3 30	3 30	3 30	3 30	4 50	4 50	4 50	4 50	4 50	7 00	9 00	14 00	24 00			
Sanitary T Branches, all Hub ends Standard	1 30			2 35																		
T Branches, all Hub ends Standard				2 35			3 25															
Double Y and Y Branches } Standard	1 40	2 05	2 05	2 60	2 60	2 60	3 35	3 35	3 35	3 35	5 25	5 25	5 25	5 25	5 25	7 60	9 00	15 00	21 00			
Double Y and Y Branches } Extra Heavy	2 00	2 75	2 75	3 60	3 60	3 60	4 45	4 45	4 45	4 45	6 75	6 75	6 75	6 75	6 75	10 50	13 50	21 00	27 00			
Double Quarter Bends Standard			1 40	2 50	2 60	1 65																
Extra Heavy			1 85	3 25	2 75	2 00																
Sanitary Crosses, all Hub ends Standard	1 70			2 90		2 90																
Long Combination Y and Bends, 24" clear, Extra Heavy	2 85																					
Bends, 24" clear, Extra Heavy	3 95																					
Long Combination Y and Bends, 36" clear, Extra Heavy				6 25				9 00			Increases and Offsets, with 6" offset, (Ex. Heavy)											
Boston Long Y and TY 2" top Vent Standard	1 80			3 30	3 30	3 30		11 00			SIZES											
Extra Heavy	2 30			4 80	4 80	4 80					2x4 3x4 4x5 4x6 6x8											
SIZES	2x4x24	2x4x36	2x4x48	3x4x24	4x5x30	4x6x36	4x6x48	5x6x30	5x6x36		SIZES											
Long Increasers Standard	2 50	3 10	3 75	2 65	4 35	5 60	6 85		6 60													
Extra Heavy	3 10		4 90	3 25	5 30	6 25	8 10		7 50													
Long Increasers with bent tapped side Branch, 14" thread Extra Heavy	4 35		5 95	4 80																		
Long Increasers, straight tapped side Branch, 14" thread Standard	3 20		4 25	3 25		6 00		8 10														
Extra Heavy	4 10			4 15																		
Long Increasers, straight tapped side Branch, 2" thread Standard					5 00		7 50	6 25	8 85													
Extra Heavy					6 25		8 10	8 75														
(Long Increasers with two straight tapped side Branches add 75 cents to above list.)																						
Long Iners, 2" Hub, Branch on side Standard	2 75		3 95	2 95																		
Extra Heavy	3 75		5 30	3 90																		
" 3" " " Standard					5 00		7 50															
Extra Heavy					6 25		8 75	7 50														
" 4" " " Standard								8 50														
Extra Heavy									8 50													
SIZES	2x1 1/2	2x1 1/4	2x1	3x1 1/2	3x1 1/4	3x2	4x1 1/2	4x1 1/4	4x2		4x2 1/2	4x3	4x4	5x2	6x2	6x4						
Tapped T and Sanitary T Branches Standard	1 45	1 45	1 45	1 80	1 80	1 80	2 20	2 20	2 20	2 50	2 50	2 50										
Extra Heavy	1 75	1 75	1 75	2 20	2 20	2 20	2 95	2 95	2 95	3 15	3 15	3 15										
Tapped, Inverted Sanitary T Branches Standard	1 60	1 60	1 60	2 00	2 00	2 00	2 45	2 45	2 45				2 95									
Extra Heavy	2 20	2 20	2 20	2 45	2 45	2 45	3 35	3 35	3 35				3 75									
Tapped, San. T Branches, Cal. Pat. Standard	1 60	1 60	1 60	2 00	2 00	2 00	2 45	2 45	2 45				3 00									
Extra Heavy	2 10	2 10	2 10	2 45	2 45	2 45	3 35	3 35	3 35				3 75									
Tap'd Crosses & Tap'd San. Crosses Standard	2 40	2 40	2 40	2 85	2 85	2 85	3 40	3 40	3 40	3 60			3 60									
Extra Heavy	3 00	3 00	3 00	3 85	3 85	3 85	4 40	4 40	4 40	4 60			4 60									
Tap'd Vent'l'g & Inverted Y Branches Standard	1 75	1 75	1 75	2 05	2 05	2 05	2 55	2 55	2 55	2 75			2 75			3 05	3 80	4 00				
Extra Heavy	2 25	2 25	2 25	2 85	2 85	2 85	3 05	3 05	3 05	3 25			3 25			4 05	5 05	5 25				
SIZES	1 1/2x2	1 1/4x2	1 1/4x4	1 1/2x2	1 1/2x3	1 1/4x4	2x3	2x4	2x5	3x5												
Tapped Increasers Standard	1 00				1 40		1 60	1 75		2 00												
Extra Heavy					1 50		1 85	2 35		2 60												
Short Increasers	85	1 00	1 20	85	1 00	1 20	1 00	1 20	1 50													
Tap'd Increasers & Offsets, 6" offset Ex. Heavy					2 10		2 25															
Long Tapped Increasers, 24" long Standard					3 50		2 65															
Extra Heavy					3 16		3 30															
SIZES	2"	3"	STANDARD			4x2	5x4	2"	EXTRA		HEAVY		4x2	5x4								
Special Reducing Sanitary Crosses					3 35								4 75									
Milwaukee or Reilly Bends, dia. circle, 36" in. " " " " " " " " " " " "			3 00			4 00				4 00	5 00											
" " " " " " " " " " " "			3 25			4 26				4 25	5 25											
Reducing " " " " " " " " " " " "					3 25	4 25					4 25	5 25		5 75								
N. Y. Sanitary T Branches with 2" Y angle inlet																						
Return Bends, Spigot outlet				2 75																		
Return Bends, Hub outlet		2 50		2 75																		
Baltimore Reg'n Running Trap, 4" dbl. Vent			6 00																			
Increasing quarter and eighth Bends " " " " " " " " " " " "																						
Incr'g 1/2 & 3/4 Bends for trap screw clean-out to 6" Long quarter Bends with 3" heel inlet, 18" long				3 75																		
Long Crosses, 20" clear						4 25																
Double Ventilating Branch						3 00																
Double Elbows			3 25																			
Triple			4 50																			
Quadruple			5 75																			
Three-way Branches			5 00																			
H Branch, Hub ends			2 25																			
Double H Branch, Philadelphia Pattern			4 50																			
Double inverted Y Branch to 2"			3 00							3 75												
" " " " " " " " " " " "			3 00							3 75												
" " " " " " " " " " " "			2 90																			
Crosses, all Hub ends																						
SIZES	4x2	4x4	4x5	4x6	5x5		4x2	4x4	4x5	4x6	5x5											
Upright "Y" Branches	3 00	3 00		4 00			4 50	4 50	5 25	6 00	6 50											
SIZES	2"	3"	4"	5"	6"	7"	8"	10"														
Single Hub Pipe per foot	32	50	68	90	1 05	1 50	1 90	2 65														
Double " " " " " " " " " " " "	1 90	2 80	3 70	5 00	6 00	8 50	11 25	15 75														

When not already included in this list, add for 2-in. Inlets, \$1.00; 3-in. Inlets, \$1.25; 4-in. Inlets, \$1.50; 5-in. Inlets, \$2.00; 6-in. Inlets, \$2.50.

In all cases where the Brass Tap Screw is furnished add in addition to Inlet (unless list specifically includes Inlet) \$.25 to list.

Y's take same list as T, Sanitary T or TV and 1/2 Y Branches.

When not already included in this list, add for 2-in. Inlets, \$1.00; 3-in. Inlets, \$1.25; 4-in. Inlets, \$1.50; 5-in. Inlets, \$2.00; 6-in. Inlets, \$2.50.

In all cases where the Brass Tap Screw is furnished add in addition to Inlet (unless list specifically includes Inlet) \$2.50 to list.

Y's take same list as T.  
Sanitary T or TY and  
½ Y Branches.

**Galvanized Tubs.**—As announced in one of our recent issues leading manufacturers of Galvanized Ware have advanced their list prices on Washtubs. We give below the new list prices now generally followed on which the ruling discount to average trade is about 10 per cent.:

<i>Light Wash Tubs.</i>				
No. 0	1	2	3	
\$67	\$79	\$89	\$99	per gross.
<i>Light Tubs, with Wringer Attachment.</i>				
No. 5	10	20	30	
\$79	\$91	\$101	\$111	per gross.
<i>Heavy Tubs, with Wringer Attachment.</i>				
No. 105	110	120	130	
\$132	\$144	\$154	\$164	per gross.

**Rope.**—Manufacturers find that buying is not up to the point where they would like to see it, but as this is the season when trade generally diminishes in volume there is nothing specially unusual in the present conditions. Card prices which are represented by the following quotations are consequently not adhered to in all instances, with the exceptions of Bolt and high grades of Manila Rope, which are well maintained. Quotations are as follows: Pure Manila, 13 to 13½ cents; B quality, 12 to 12½ cents. Pure Sisal, 9¼ cents; No. 2 quality, 7¾ to 8 cents; No. 1 Jute, ¼ in. and up, 9 cents; No. 2 Jute, 8½ cents.

**Hickory Handles.**—As announced in our last issue, Turner, Day & Woolworth Handle Company, Louisville, Ky., issued a new schedule of list prices, which is now in the hands of the trade. The feature of the list is that prices are arranged in two groups, one of which is printed in black ink and the other in red, the former group being subject to 10 per cent. greater discount than the latter, which includes the better grades of Handles, requiring timber of a good quality, now exceedingly expensive and hard to get. It is understood that the new list has been, or will soon be, adopted by other manufacturers, and we give it below, indicating the list prices on the red ink group by full-faced type. The market on this group may be represented by a discount of 65 and 10 per cent., and on the black ink group, the list prices of which are printed in the regular type, by a discount of 70 per cent. It should be noted that considerable concessions beyond these prices may be obtained on the

*Second Growth Hand Shaved Axe Handles.*

Single and Double Bit.	30 to 36 in.	38 in.	40 in.	42 in.	44 in.
Octagon and Oval, Plain and Scroll					
End. per dozen...	10 00	10 80	13 60	14 80	16 00

*Second Growth Pick and Adze Handles.*

Octagon and Oval.	30 in.	32 in.	34 in.	36 in.
Drift Pick.....per dozen	10 00	10 00	10 00	10 00
Poll Pick....." "	10 00	10 00	10 00	10 00
Coal Pick....." "	8 80	8 80	8 80	8 80
R. R. Pick....." "				11 60
Adze, R. R., ship and carpt. ...." "		10 00	10 00	10 00

*Second Growth Sledge, Tool and Maul Handles.*

Octagon and Oval.	26 and 30 and 34 and				
	24 in.	28 in.	32 in.	36 in.	40 in. 42 in.
Per doz...	4 40	5 40	5 80	6 60	7 40 8 00 8 80

*Second Growth Hatchet and Hammer Handles.*

Length.	12	13	14	15	16	17	18	19	20	22	24
Hatchet, Shingling.....per dozen	1 90	1 90	1 90	1 90							
" Broad or Bench....." "					2 10	2 30	2 80	3 20	3 40		
Machinist Hammer....." "	1 90	1 90	1 90	1 90	2 10	2 30	2 30	2 70	2 70	3 40	4 40
Blacksmith "....." "	1 90	1 90	1 90	1 90	2 10	2 30	2 30	2 70	2 70	3 40	4 40
Riveting "....." "	1 90	1 90	1 90	1 90	2 10	2 30	2 30	2 70	2 70	3 40	4 40
A. E. & R. E "....." "	1 90	1 90	1 90	1 90							

product of some smaller manufacturers. The list is as follows:

*Turned Hickory Axe Handles.*

Market and N. N. Y. Patterns.	Extra.	Exclr.	No. 1.	No. 2.	No. 3.
Axe Handles, per dozen:					
36, 34, 32 and 30 in.....	8 20	6 30	4 50	3 40	2 70
Boys' 28 and 26 in.....	5 70	4 80	3 60	2 60	
38 in., single and double bit..	8 90	6 90	5 20	3 80	3 00
40 "....." "	9 80	7 80	5 50	4 00	3 20
42 "....." "	10 70	8 30	5 90	4 20	3 30
44 "....." "	12 00	9 20	6 50	4 60	3 50
Straight 30 to 36 in.....	8 20	6 30	4 40	3 20	2 60
Double Bitted 30 to 36 in..	8 20	6 30	4 60	3 00	2 60

*Hand Shaved Hickory Axe Handles.*

Octagon and Oval Hand Shaved Single and Double Bit.	XXX	XX	X
Axe Handles, per dozen:			
36, 34, 32 and 30 in., plain end....	9 00	7 20	5 40
38....." "	9 50	7 60	5 80
40....." "	10 60	8 40	6 40
42....." "	11 80	9 60	7 20
44....." "	13 00	10 40	8 00
36 and 34 in., scroll end....	9 60	7 80	6 00
36 in., Straight Lumberman's.....	9 00	7 20	5 40
38 "....." "	9 50	7 60	5 80
Broad Axe Handles.....per dozen, \$7.20			
Adze, House Carpenter, Ship and R. R., 36, 34 and 32 in.....	8 40	7 20	5 20 3 60
Post Maul Handles, 30-36 in.....	6 80	5 80	4 50 3 20

*Turned Hickory Pick Handles.*

Surface or R. R., Mattock and Miners'.	Extra.	Exclr.	No. 1.	No. 2.	No. A.
Pick Handles, per dozen:					
Surface or R. R., 36 in....	9 60	7 60	6 40	4 10	3 40
Drifting, 32, 34 and 36 in..	8 20	5 40	4 50		
Poll, 32, 34 and 36 in.....	8 20	5 40	4 50		
Coal Miners' Small Eye, 3 x 3/4, 34.....	6 60	5 20	3 30		
Coal Miners' Medium Eye, 3 x 3/4, 34.....	6 60	5 20	3 30		
Coal Miners' Large Eye, 3 1/4 x 3/4, 34.....	6 60	5 20	3 30		
Grub Hoe Handles, 36 in....	9 60	7 60	6 40	4 10	3 40
Hand Shaved Pick, add 80 cents per dozen to above prices.					

*Turned Sledge, Tool and Maul Handles.*

Sledge, Tool or Maul. Length. 24 in. 28 in. 32 in. 36 in. 38 in. 40 in. 42 in.						
Extra, per doz.	3 30	4 20	4 70	5 60	6 00	6 50 7 00
No. 1 " " " " " " " "	2 60	3 00	3 40	4 20	4 40	4 80 5 20
No. 2 " " " " " " " "	1 60	2 10	2 30	2 60	2 80	3 40 4 00
Hand Shaved Sledge, add 60 cents per dozen to above prices.						

*Turned Hammer and Hatchet Handles.*

Length.	11	12	13	14	15	16	17	18	19	20	22	24 in.
Machinists' Hammer.....per dozen	1 45	1 45	1 45	1 45	1 45	1 60	1 60	1 80	2 10	2 10	2 30	2 60
Blacksmiths' Hammer....." "	1 45	1 45	1 45	1 45	1 45	1 60	1 60	1 80	2 10	2 10	2 30	2 60
Riveting Hammer....." "	1 45	1 45	1 45	1 45	1 45	1 60	1 60	1 80	2 10	2 10	2 30	2 60
Hammer, A. E. & R. E....." "		1 45	1 45	1 55	1 55							
Hatchet, Broad or Bench....." "						1 75	1 80	2 10	2 60	2 60		
" Shingling....." "		1 45	1 45	1 55	1 55							

**Hand Screws.**—In our last issue it was stated that manufacturers of Hand Screws, who have been selling their product on a low list, have in deference to the expressed wish of the National Hardware Association adopted a new and much higher list, from which larger discounts can be quoted. This revised list is given herewith. The new price on these goods is represented by discount 70 and 10 to 70 and 10 per cent. The new list is as follows:

Diameter of Screws.	Whole Length of Screws.	Whole Length of Jaws.	Size of Jaws.	Open.	Price per Dozen.
1 1/4 in.	28 in.	24 in.	3 x 3 in.	17 in.	\$40.00
1 1/4	26	22	2 3/4 x 2 3/4	15 1/2	35.00
1 1/4	24	20	2 3/4 x 2 3/4	13 3/4	32.00
1 1/4	22	20	2 1/2 x 2 1/2	12	30.00
1 1/8	22	18	2 1/2 x 2 1/2	12 1/4	28.50
1 1/8	20	18	2 3/4 x 2 3/4	10 1/2	27.00
1	20	16	2 3/4 x 2 3/4	11	25.00
1	18	16	2 1/2 x 2 1/2	9 1/4	23.50
7/8	18	14	2 1/4 x 2 1/4	10	22.00
7/8	16	14	2 x 2	8 1/4	20.00
7/8	16	12	1 3/4 x 1 3/4	8 1/2	18.50
3/4	14	12	1 3/4 x 1 3/4	7 1/4	17.00
3/4	12	10	1 3/4 x 1 3/4	5 1/2	14.50
3/4	10	8	1 3/4 x 1 3/4	4 1/2	12.00
5/8	8	7	1 1/4 x 1 1/4	3	9.50
1/2	6	5	1 x 1	2	8.00
3/8	5	4	7/8 x 7/8	1 1/4	7.00

**Sad Irons.**—Prices on Mrs. Potts' Sad Irons, which were recently advanced, as noted in these columns, are said to be well maintained by the manufacturers. It is reported, however, that considerable orders have recently been taken at low prices by jobbers who, through purchases prior to recent advances, are now able to do business at a profit at or below the manufacturers' extreme quotations.

**Window Glass.**—A meeting of the Eastern Window Glass Jobbers' Association was held at Old Point Comfort, on July 8, from which no official report has been received as to action regarding prices. There is an effort on the part of manufacturers to hold their stocks of Glass for higher prices, as the past fire did not result in satisfactory profits, according to reports. The machine plants are the only Glass factories now in operation, so that the stocks in the hand operated manufacturers' hands will be the main source of supply until these factories start again in the fall. It will be the endeavor of



these manufacturers to get the skilled workmen to accept a wage scale which will put the hand operated factories in a position to compete with the machine factories, by bringing the cost of making Glass down to a level with, or below, that of the machine made product. This, no doubt, will be a difficult thing to accomplish, as the unions are strong and the workmen look to the present rather than to their future good, so that the start may be long delayed in the fall. The impression prevails to a considerable extent that Glass is cheaper now than it will be in 30 or 60 days. In Greater New York jobbers' quotations from jobbers' list, October 1, 1903, which, it will be remembered, is about 20 per cent. higher than the manufacturers' list, January 1, 1901, are 90 and 15 per cent. discount on all sizes, single and double strength. Outside Greater New York no quotations that would represent the market fairly are available.

**Copper Products.**—The leading producing interest of Raw Copper on July 9 reduced the price of Ingot Lake Copper to 23 cents per pound and electrolytic to 22 cents. Following this action, the mill representatives on July 10 made corresponding reductions in accordance with those changes in several important staples of manufactured material based partly or wholly on Copper. Manufacturers of innumerable articles containing more or less Copper in its many forms have not had time to overhaul many of the schedules necessarily sympathizing with any important modification in the price of so prominent a metal, but the following prices, which are also reductions, have been determined on—viz.: Bare Copper and Weatherproof Wire reduced 3 cents per pound, list, to 24½ cents, base; Magnet Wire 3 cents to 27½ cents per pound, and Rubber Covered Wire to 23 cents per pound, base.

As we go to press Wednesday afternoon the situation with reference to such products as Sheets, Rods, Tubing and kindred materials is in the hands of a committee of mill representatives who are conferring as to the prices to be made to put the goods referred to in harmony with the reduction in Ingots. It is hoped by some who are both interested and exceptionally well informed that the prices about to be determined may hold good for some time, and the market thus be maintained on a fairly regular basis. It will doubtless be feasible to make a definite announcement in our next issue in regard to the detailed prices which will be determined upon by the manufacturers in the various lines affected.

**Paris Green.**—The recent warm weather has stimulated demand slightly, so that second orders have been received to a limited extent by some manufacturers. Prices remain unchanged. Manufacturers' quotations are as follows, subject to change without notice, on the basis of 5 tons and over:

Arsenic Kegs .....	26 c.
Kegs, 100 to 175 pounds.....	26¼c.
Kits, 14, 28 and 56 pounds.....	27¼c.
Paper Boxes, 2 to 5 pounds.....	27¼c.
Paper Boxes, 1 pound.....	28 c.
Paper Boxes, ½ pound.....	29 c.
Paper Boxes, ¼ pound.....	30 c.

Terms, 30 days, net, f.o.b. New York; Chicago delivery, ½ cent per pound advance.

The following extras are charged for smaller quantities:

5,000 to 10,000 pounds.....	¼c.
1,000 to 5,000 pounds.....	1c.
500 to 1,000 pounds.....	1½ to 2¼c.
Less than 500 pounds.....	3 to 3¼c.

The majority of manufacturers charge 2½ and 3½ cents advance, respectively, on the last two quantities.

**Linseed Oil.**—Local conditions regarding demand continue as for some time past, new business not being particularly active for jobbing lots. The deliveries called for on contract orders, placed with manufacturers some time since, are moderate in volume. There does not appear to be any immediate prospect of a marked revival in business. The price of Flax Seed shows but little fluctuation. New York quotations are as follows, according to quantity: City Raw, 45 to 46 cents per gallon; Out of Town Raw, 44 to 45 cents per gallon. Boiled Oil is 1 cent a gallon over Raw.

**Spirits Turpentine.**—Demand is moderate, and prices are more steady following a drop of ½ cent from last week's prices. New York quotations are as follows, according to quantity: Oil Barrels, 60 to 60½ cents; Machine Made Barrels, 60½ to 61 cents per gallon.

## SAD, BUT TRUE.

*With apologies to Danny Deever.*

By OPPIDUM.

What is the market price to-day?  
Says salesman who's afraid.  
Look in the book! Look in the book!  
The manager essayed.

How are we on deliveries?  
Says salesman who's afraid.  
It's in the book! It's in the book  
That shipments are delayed!

Is our stuff steel or iron?  
Asks salesman who's afraid.  
I guess I'd better 'phone the mills!  
Says manager, dismayed.

Oh! there are some lovely people  
In that grand old industry;  
Those who run the Eastern markets—  
They are late of Kankakee.  
And the things that they don't know would fill  
A fair sized library.

L'ENVOI.

It's not the rosewood desk that counts,  
It's plain ability.

F. W. BUCKMAN and C. C. NARET have taken adjoining offices in the Matlage Building, 97 Warren street, New York. Mr. Buckman is local sales manager for Estes Mills, Fall River, Mass., manufacturer of Cotton Products, while Mr. Naret will represent Arcade Mfg. Company, Freeport, Ill., maker of Coffee Mills, Mop Sticks and Hardware Specialties, whose account has been in the hands of H. Kornahrens, 111 Murray street. As the lines of these two manufacturers are closely allied, their agents believe that their joint location will be of benefit to them and likewise prove convenient for the trade.

THE BANTAM ANTI-FRICTION COMPANY, Bantam, Conn., has lately issued a bulletin entitled the "Bantam Anti-Friction Booster," in the interest of its products. In addition to lists and illustrations of the company's lines of Ball and Roller Bearings, the bulletin contains a good deal of matter of a humorous character, including a unique map showing the location of Bantam, which is said to be "99 miles from New York City, 1000 ft. above sea level," and having "more manufacturing industries in proportion to its population than any other city of its size in the United States."

JOHN MACKEY & SON, retail Hardware merchants, South Haven, Mich., celebrated Fourth of July week by holding special sales, which began on Monday, the 1st, and continued until Saturday night. A poster circular relative to the bargains thus offered was issued, containing illustrations and prices. In view of the exceptional character of these prices it was stipulated that all transactions in the goods should be on a cash basis only.

THE STEWART IRON WORKS COMPANY, Cincinnati, Ohio, has commenced the publication of a monthly bulletin under the title "Stewart's Iron Fence." The first number, that for July, is devoted to Cemetery Fence, several attractive examples of which are illustrated. The advantages possessed by Iron Fence for this purpose are briefly set forth.

## FOLLOW-UP SYSTEM FOR RETAILERS.

BY CLARFIELD.

**W**HAT efforts are the retail Hardware merchants throughout the country making to keep in close personal touch with their customers and prospective customers? Thousands of dollars annually are being spent in general advertising effort to bring trade into the Hardware stores. It pays handsomely to keep lists of customers thus gained in card index files arranged alphabetically or by towns and counties, in order that their customers may be reached regularly with printed announcements and form letters.

Such a system does more than merely sell goods. It keeps the patron alive to the fact that the merchant is taking a personal interest in him, and even results in bringing persons repeatedly into the store who otherwise might call only infrequently if at all.

### Follow-Up Letters.

A series of follow-up letters printed in imitation type-writer can be prepared in such a way that they will have a personal tone, and filled in with address and date to match the printing, so that the same letter can be sent out to different customers at different times and still bear every mark of being a personally dictated commu-

Jones, Mr. James A. Carpenter- 144 High St.
Mailed letter #1-Book #2 1/15/07.
2/5/07 called personally. Bought Simmons

Fig. 1.—Method of Entering Name and Indexing Cards Alphabetically.

nication. Customers can be reached at regular intervals. Printed slips or folders announcing seasonable special offerings can be inclosed with these letters with excellent results. This plan carefully carried into execution will net the retailer many times its cost.

### Methods of Entry.

All form letters and printed matter should be numbered in order that entry can be made upon each customer's card when each particular form letter or circular is mailed. Replies from customers should be recorded upon their cards, and as far as possible a memorandum of goods bought personally from such announcements should also be kept upon the cards. In this manner it can be seen at a glance exactly which letters and printed forms each customer has had, and what results have been

Hill, Mr. Alfred A. St. Albans-Clare Co. Vt.
1/27/07 mailed letter 2-book 3.
2/25/07 mailed letter 3-book 4
3/15/07 inquiry regarding oil stoves.
4/10/07 sent catalogue "blue flame" rickless
4/25/07 ordered 00 stove.

Fig. 2.—Method of Indexing by County or State.

obtained in each individual case. This is primarily a mail order plan. The results from customers living in outlying districts should show a gratifying proportion of mail orders, but the plan will be equally effective among those patrons who come to the store in person.

Fig. 1 shows the method of entering on a card the transactions with a customer who has sent in an inquiry regarding Saws. This is indexed alphabetically and

should be filed behind the index card showing letter J. This plan is adequate for a small list, but becomes cumbersome when the list is very large. With large lists it is better to index according to towns, counties or States, and then subdivide each division alphabetically.

### A Form Letter.

Form letter No. 1 may have been something like the following:

DEAR SIR:

We are making a special offer to interest all carpenters in this vicinity in our reliable lines of carpenters' tools of every description.

We know that you are handling some of the best work in this territory, and that you will be interested only in the most reliable tools.

We do not end our display with one or two lines, but we carry complete lines of several of the most substantial makes. Our large output enables us to buy in great quantities, and we, therefore, offer these well-known brands at prices which compare very favorably with less meritorious goods which are frequently offered in competition.

We have attractive little folders and booklets illustrating these different lines.

You are welcome to any or all of these folders and booklets.

Just drop us a card or ring up 'Phone No. 21 Main.

Yours respectfully,

These circulars or folders can be obtained from the manufacturers, and the retailer's name and address can be printed in at a nominal cost.

### Indexing by Counties.

The method of indexing by counties or States is almost the same as indexing alphabetically, except that the initial letter of the county or State is placed in the upper left-hand corner of the card, as shown in Fig. 2. This card is then slipped behind the index card C of one color, and in case the list is very large it is subdivided alphabetically with index cards of another color. In such a plan this card would be found behind possibly a blue index C and a salmon colored index H, which would be the subdivision showing the name Hill in Clare County.

### It Will Be Noticed

that this name was followed two or three times with different form letters and printed matter before an inquiry was received or a sale made. These inquiries are all entered upon the cards in the manner shown, so that the entire follow-up transaction with this customer can be seen at a glance.

### Keep a Scrap Book.

It is wise to keep a record of all form letters and printed matter in a scrap book of convenient size, where each individual piece can be numbered and memorandum can be made as to the date of its preparation and its cost. The sales manager can then turn to this book and in a moment's time give instructions as to which form any name that he may have before him should receive.

For instance, he might find that Alfred A. Hill, Fig. 2, had not been heard from in a month or more and turning to his scrap book would find that form letter No. 5 would exactly fit his case and order it sent out with one of his pieces of printed matter without losing the time necessary to dictate a special letter. Furthermore, he can tell from this record at all times which branches of his business the various customers have been interested in. Many times letters can be so prepared and entire lists can be covered at one mailing.

Simonds Mfg. Company, Fitchburg, Mass., and 40 Murray street, New York, has recently begun to market its Culley flexible back saw blade. Among its characteristics, as described by the company, are that it will bend and not break; that it may be used on jobs where the work cannot be laid out flat, and that when used bending down under a sink or reaching back of a tank or in other difficult places the blade will not break, even if the saw frame turns over with the blade in the cut. Other features that adapt it for plumbers and electricians particularly are that it cuts brass, tubing and stringy metals, which frequently ruin the ordinary hardened blades in a few strokes. The teeth are evenly set, hold their edges and will not shell out. The sizes offered are 8, 9, 10 and 12 in. lengths, fine or coarse teeth.

# Hardware Window Display

Fourteenth Article.

## WINDOW REGARDED AS A SALESMAN.

**T**HE value of a window display must be judged entirely by results. Its composition and arrangement may seem in every way admirable. The window dresser may think it worthy of being photographed and reproduced in the trade papers, but if it does not attract passers-by and bring some of them into the store to open the way for sales it is a failure. In this respect the window may be regarded in the light of a salesman, applying to it some

courage him in it and give him most of the lettering to do, allowing him sufficient time to turn out the best work of which he is capable. Many a clerk with a little artistic talent is glad to do this sort of thing out of business hours for a little extra remuneration.

When a good sign is made it will be found economical to file it away instead of destroying it after its original use, since in a few months, or a year at the most, it is highly probable that a similar display will be installed and the same sign will again be appropriate. This is the system employed by the John E. Bassett & Co., New Haven, Conn., and by courtesy of this house we are enabled to present herewith reproductions of a number of signs which they have used one or more times and are still keeping on hand.

An examination of the cuts will make it clear that

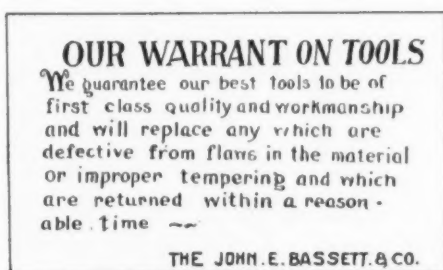


Fig. 1.—A Strong Sign to Accompany a Tool Display.

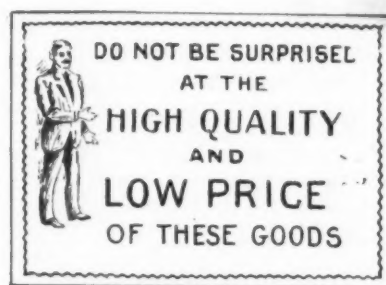


Fig. 2.—The Emphasis in the Right Place.

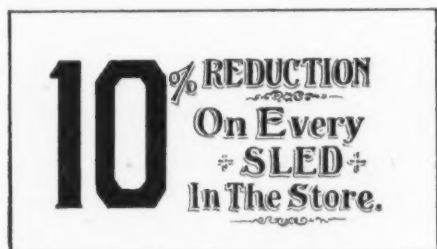


Fig. 3.—Moving Sleds Late in the Season.



Fig. 4.—Closing Out Skate Stock.

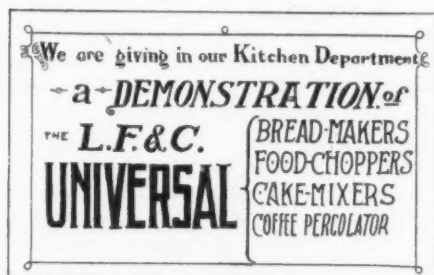


Fig. 5.—Demonstrations for the Public.

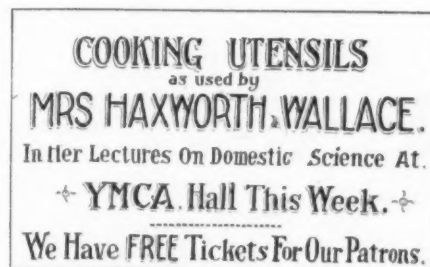


Fig. 6.—Up to Date Cooking Utensils.

of the same standards and principles which are applied to salesmen and salesmanship. Like a salesman the window must talk, if not in actual words, represented by signs, price cards, &c., at least by suggestion, presenting the articles which it offers in the most favorable light.

### Good Signs Effective Adjuncts to Window Displays.

The matter of marking prices on goods in window displays has already been referred to in these columns, and it has been pretty clearly shown that the practice of merchants regarding this question must be varied according to competition, the class of goods displayed and other circumstances. As regards signs in the show window, however, it is generally admitted that cleverly written and well lettered cards are an effective adjunct to any display. They must at one and the same time complete the impression made by the layout of the window and also add to it some new idea, touch of humor or suggestion of efficiency which will appeal favorably to the observer and reader.

Window signs must be neatly lettered or they will do more harm than good. If there is an employee in the store who has a knack in this direction, it is well to en-

they are interesting, not only as examples of good mechanical work, but also because of their suggestiveness as to methods of handling and pushing various lines of goods. Fig. 1, representing a sign made to accompany a general tool display, indicates the firm's method of gaining and holding the confidence of its trade on all lines of Tools. Fig. 2 is a pointed accompaniment for a display of fine goods marked with especially low prices. The signs reproduced in Figs. 3 and 4 suggest an effective way of stimulating the sale of Skates and Sleds after the high of the season is over. Modern methods of featuring Household Specialties and Cooking Utensils are suggested by Figs. 5 and 6.

(To be continued.)

THE COLUMBIAN CUTLERY COMPANY has succeeded the Wilkinson Shear & Cutlery Company and Wilkinson Shear Company, Reading, Pa. The Columbian Company will continue the manufacture of Wilcut Butcher and Kitchen Knives, Sheep Shears, Grass Shears and kindred Cutlery specialties as formerly made by the Wilkinson concerns. The officers of the new company are: Cyrus G. Derr, president; Philip A. Bushong, secretary-treasurer, and Charles S. Prizer, general manager.



## LOCKWOOD & PALMER'S STORE.

THE Hardware establishment of Lockwood & Palmer is located in Stamford, Conn., at Park place, the junction of several streets. Mr. Lockwood, the senior member of the firm, has been engaged in the Hardware business in that city for more than 40 years. In 1897 Mr. Palmer purchased a half interest in the business, with which both partners are still identified. Later the brick and stone building now occupied by the firm was erected. This is 66 x 84 ft. in size, three stories and cellar. The ceilings of the first, second and third stories are, respectively, 14, 13 and 12 ft. high. The walls of the building were built strong enough to permit the addition of another story, when desired. The plan of the first floor, Fig. 1, shows the general arrangement of the fixtures and the location of goods. The show windows extend across the entire front of the building and a short

Iron Ware; also Lead Pencil case, cases for Dusters and Brushes, Pot Cover stand, Bolt and Paint racks, &c. The remaining floor space is used for various lines of goods, each in season, as indicated in Fig. 1. Season goods are placed on the first floor a little before they are actually called for, and take the place of those for which the season's demand has about ended. The oak framed showcases on each side of the center aisle, Fig. 2, are in 10-ft. sections, with curved sections at the ends nearest the entrance. Each case has three shelves, 8 in. apart, of different widths. The bottom shelf is 19 in. wide, the next one 15 in. and the top one 12½ in. wide. This arrangement prevents goods on the lower shelves being obscured by the shelves above. Some of the shelves are solid, while others are made up of removable trays on skeleton frames. The general lines of goods displayed in the showcases can be seen by reference to Fig. 1. In the extreme right hand corner of the first

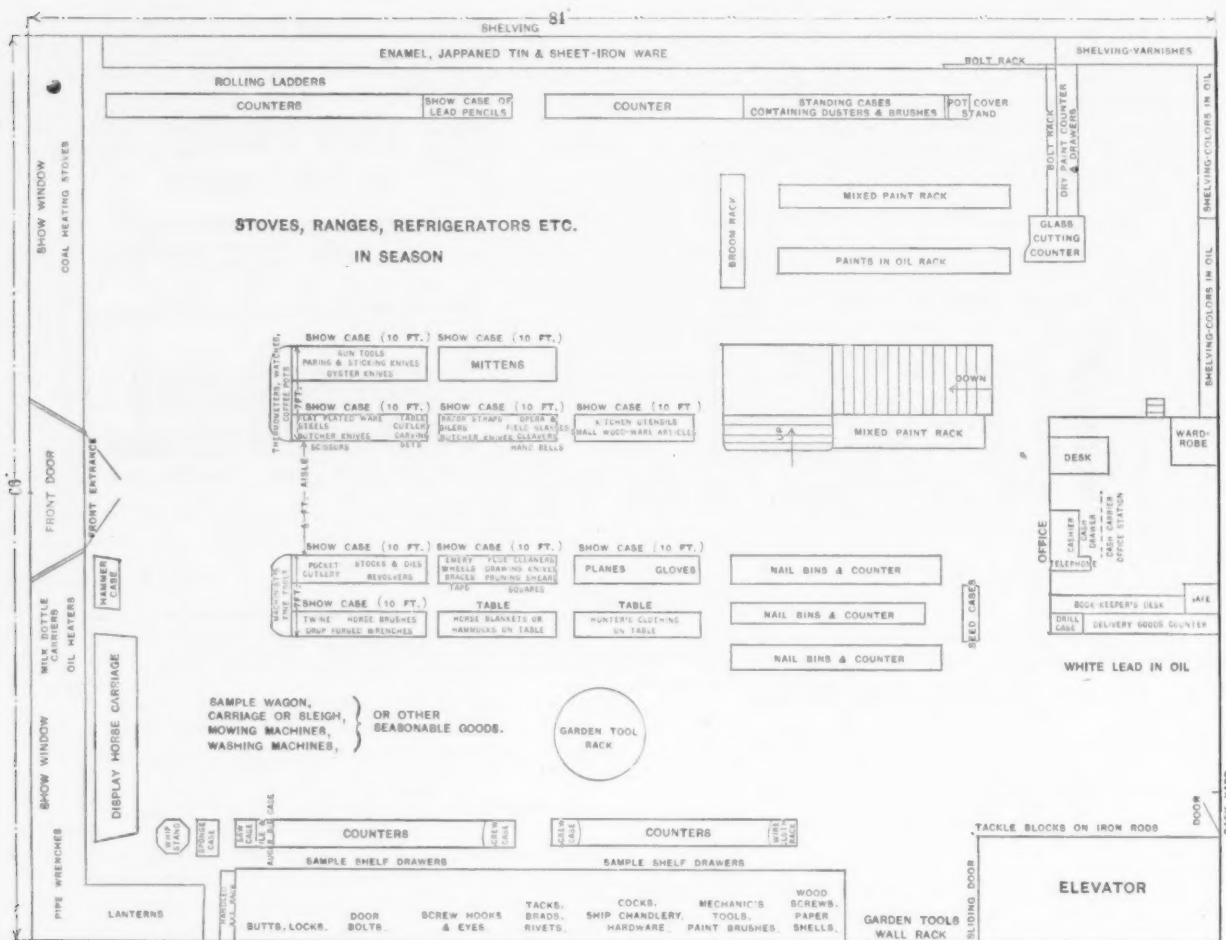


Fig. 1.—First-Floor Plan of Lockwood & Palmer's Store.

distance on one side. On entering the store a sense of abundance of space is the first impression received, as the broad aisle, 6 ft. wide, extends from the front entrance to the office in the rear, as shown in Fig. 2, and a view of the entire first floor is unobstructed, the showcases on either side of the aisle being but 3 ft. high. In the rear of the showcases, on the left, are the staircases leading to the second story, and underneath to the cellar, while the Nail bin counters are opposite, on the right. From Fig. 1 it will be seen that Shelf Hardware is located on the right hand side of the room. The shelving is of the step variety, the base being of different depths part of the way up, above which handles on the uprights permit of reaching the drawers in the upper shelves. At different points on the same side of the store are handled Hammer case, Whip stand, Saw case, Sponge case, File and Auger Bit case, Screw cases, Wire Cloth rack, Garden Tool racks, Seed case, tables for season goods, &c. On the left hand side of the room is shelving along the wall containing Enameled, Japanned, Tin and Sheet

floor, in the rear, is an electric elevator, 9 x 13 ft. in size, large enough to accommodate the largest Farm Wagons handled by the firm. An ingeniously planned home made rack for Handled Axes, attached to the end of the shelving, on the right hand side nearest the front of the store, is shown in Fig. 3. It is composed of two shelves supported by shelf brackets. The bottom shelf is 13 in. from the floor and 6½ in. wide. The upper shelf is 18 in. above the first one and is 4½ in. wide. Half of the Axes stand on the lower shelf, with the handles up, and the other half hang from the upper shelf, with the handles down. To thus accommodate the handles the openings in the shelves are dodged. The heads of the Axes rest on small blocks attached to the lower shelf, back of which grooves are cut in the shelf to receive the bits. This arrangement raises the head higher than the point of the bit and prevents the Axes falling from the shelf. The bits of the Axes hanging from the upper shelf rest in grooves cut to receive them. Thus Axes alternate on both shelves, a head and then a handle. The rack is

economical of room, as 50 Handled Axes can be accommodated in a comparatively limited space. From Fig. 1 it will be seen that three Nail bin counters are located opposite the stairway. A portion of one counter is illustrated in Fig. 4. Each counter has two rows of bins on each side, divided by a board partition in the

stand the hard usage to which Nail bins are usually subjected.

(To be continued.)

THE SCHMIDT HARDWARE COMPANY and the Drake Hardware Company of Burlington, Iowa, have been con-

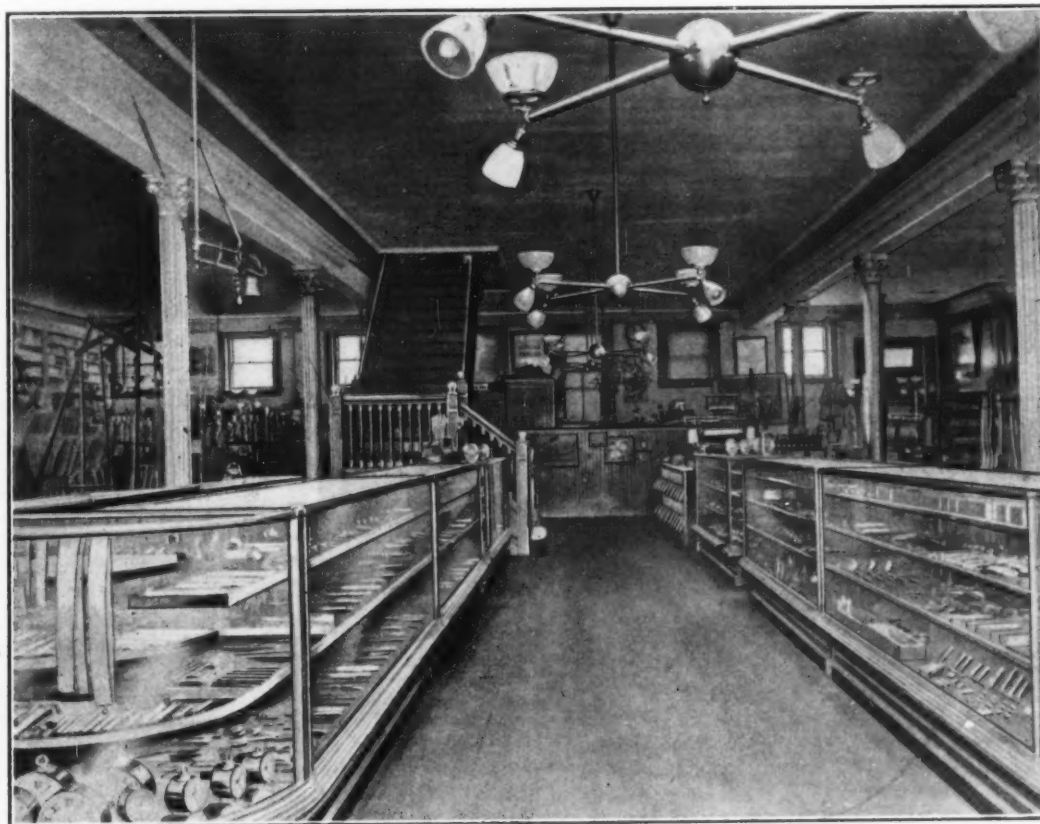


Fig. 2.—View from the Entrance.

center, extending the entire length of the counter. There are 11 bins in each row, or 22 bins on each side of each of the three counters. Each opening is 14 in. wide and 17½ in. deep, between wooden uprights, which extend back to the center division. The bins are made of No. 24 gauge Galvanized Iron, semicircular in form, which pro-

solidated as the Drake Hardware Company. Both of these houses have long held commanding positions in the jobbing Hardware trade of the upper Mississippi Valley, and it is their purpose in thus uniting forces to cover the field more thoroughly and economically. The business will be concentrated in the buildings occupied by the old Drake

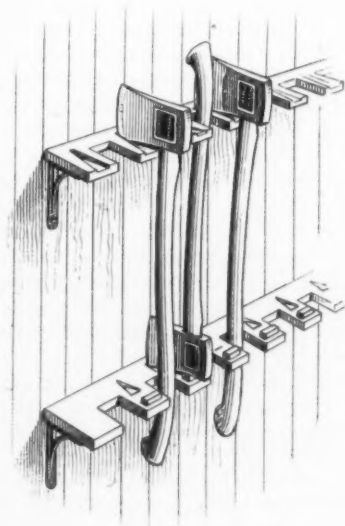


Fig. 3.—Handled Axe Rack.

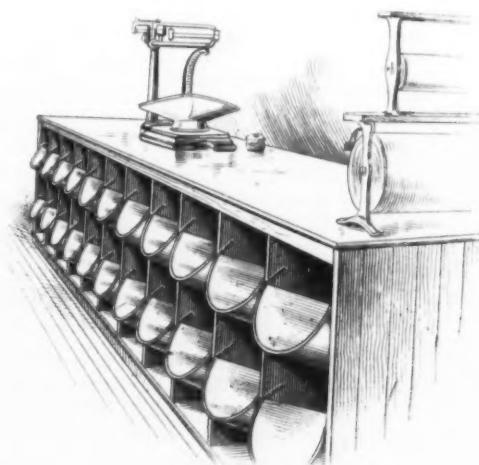


Fig. 4.—Galvanized Iron Nail Bins.

ject at the bottom 4 in. beyond the uprights. The outer edge of each bin is wired with 5-16-in. Iron Rods, the extended ends being flattened. Countersunk holes in the ends permit the Rods to be fastened to the uprights on each side by Screws. This arrangement makes the bins convenient to put Nails in; also to weigh them out, and

Hardware Company, which are of modern construction and have exceptional shipping and other facilities for handling wholesale trade. The officers of the reorganized Drake Hardware Company are as follows: Charles E. Otto, president; E. D. Adams, vice-president; Walter Schenck, secretary; S. H. Jones, treasurer.





of the company's power plant is measured by means of indicator cards and also on the basis of coal consumption, so that very close to the actual power required to operate and heat the works is known. From this total the power used by each department is obtained by means of tests, closely enough for practical purposes, and each department is charged with its share, the amount being reduced to percentage of the department's item of productive labor. Other elements in the second item in the department's general expense are supplies apart from material used in manufacturing, repairs and similar items. This total is also reduced to a percentage of the cost of productive labor. The total of this and the percentage of heat and power constitute the general expense of the department. The gathering of the various items which enter into the indirect labor expense of a department is easily accomplished from the general cost system, just as the cost of labor is obtained from the time cards, whether hourly wage or piece work is employed (the latter more commonly used in these works).

The other item of general expense applies to the entire works. It is made up of selling expenses, including advertising, expenses and salaries of salesmen, agency expenses, including branch offices, repairs of building and electric lighting plant, hangers, shafting, belting and pulley repairs, piping repairs, repairs internal telephone system, freight department expenses and labor, office stationery, expenses of administration, including office salaries; postage and telegrams, telephone, laboratory labor and expenses, taxes and insurance, horse and wagon and depreciation of building, electric lighting plant shafting, pulleys and machinery. This includes every item of expense not included in productive labor and departmental general expense, with the exception, of course, of raw materials.

Care is taken when determining to what account items of expense should be charged, whether to general expense or departmental general expense, not to produce distortion of percentages by admitting into an account some item which is in itself abnormal. By avoiding such a condition the management is able quickly to discern a distortion arising in the course of manufacturing, as, for instance, an unexplained increase or decrease in the cost of some product.

As to the frequency of going through the system to get the desired percentages of general expense to productive labor it all depends upon general business conditions. When business is running along on a level when the payroll does not vary to any appreciable extent, the percentages remain accurate. Under such conditions the Norton Company goes into the details of figuring percentages once in about three months. But when business makes a sudden advance or a depression sets in it is necessary to get upon the new basis of percentages immediately. The minute the productive labor payroll increases or decreases the percentage which the more constant items of general expense bears to labor decreases or increases. The variation in any system between dull times and such times as these is very marked.

The working out of the system in figuring up the total cost of a certain order is illustrated in the sample cost sheet, shown in the illustration. The figures employed are entirely imaginative and are exaggerated, actual figures not being available, for obvious business reasons. The first of the two vertical columns is devoted to the cost of labor, plus loss by rejection, and it is upon these figures that the general department general expense, or direct expense, and the general expense cost are figured. It will be noted that the departmental direct expense is figured four times, for four departments, and this is in addition to the general expense which applies equally throughout the works.

The percentages of materials are known from formula for this type and number of wheel. The cost of each material is also a known quantity. The cost of productive labor is ascertained from the piece work rate for this particular wheel, where piece work is employed. The productive labor cost where hourly wage is paid is reckoned in an accepted per cent. of the known list price, which in the illustrative example in the item of mixing

is supposed to be 4 per cent. on the list price of \$50 per wheel.

The cost of labor, plus loss by rejection, is the basis upon which both classes of general expense are obtained. Noting the figures in the first column, denoting the cost of labor, the departmental general expense of the mixing, molding and shaving department is 125 per cent. of \$268.75; that of the kiln department 135 per cent. of \$115; that of the trueing, bushing and testing department 110 per cent. of \$183.60, and that of the packing department 140 per cent. of \$275. This gives a total departmental general expense of \$1078.15. The cost of material, labor and departmental general expense figures \$2931.50, which is known as the direct cost.

The general expense, applied to this department in common with the entire works, is figured on the total of productive labor, plus loss by rejection, which in the illustration is \$842.35. Taking the percentage of general expense at 200 this item of the cost of this order of Wheels figures \$1684.90, bringing the complete cost to \$4616.45. Reduced to cost per wheel it is \$46.16.

It will be noted that the analysis of cost is complete, each element of production being ascertained per single wheel. The analysis also acts as a check upon the total of the second vertical column, which is devoted to totals.

### PRICE-LISTS, CIRCULARS, Etc.

*Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.*

SAMUEL WINSLOW SKATE MFG. COMPANY, Worcester, Mass., maker of Ice and Roller Skates: Catalogue H illustrating the company's line of Roller Skates, including Extension Cycle Ball Bearing and Extension Plain Bearing Roller Skates.

ROBERT C. REEVES COMPANY, 187 Water street, New York: Descriptive catalogue of Agricultural and Horticultural Implements and Machinery, Garden, Field and Flower Seeds, Fertilizers, &c.

PELOUZE SCALE & MFG. COMPANY, 118-132 West Boulevard, Chicago, Ill.: Catalogue H devoted to Scales, including Family, Hanging, Spring, Counter, Ice, Computing, Confectionery, Postal, Mail and Express Scales, Coffee Percolators, Hem Gauges, &c.

T. ROWLAND'S SONS, INCORPORATED, Cheltenham, Pa.: Ames Shovel & Tool Company, owners: Revised price-list and catalogue of Shovels, Spades, Scoops, Drain and Ditching Tools.

PARIS MFG. COMPANY, South Paris, Maine: Catalogue of children's goods, including Wheelbarrows, Carts, Wagons, Spring Boards, Folding Tables, Step Ladders, Desks, Sleds, &c.

LAWSON MFG. COMPANY, 40 Dearborn street, Chicago, Ill.: Catalogue of its line of Matchless Pivot and Spring Hinges, Window Locks and Door Guards. Dimensions of doors that can be used with the various sizes of Hinges, which are indicated by number, are given for the assistance of buyers in selecting Hinges.

N. Y. FLEXIBLE METALLIC HOSE & TUBING COMPANY, 161-165 Lafayette street, New York: Price-list of Flexible Metallic Hose in copper and steel; also one relating to "BBBB" Balata Belting.

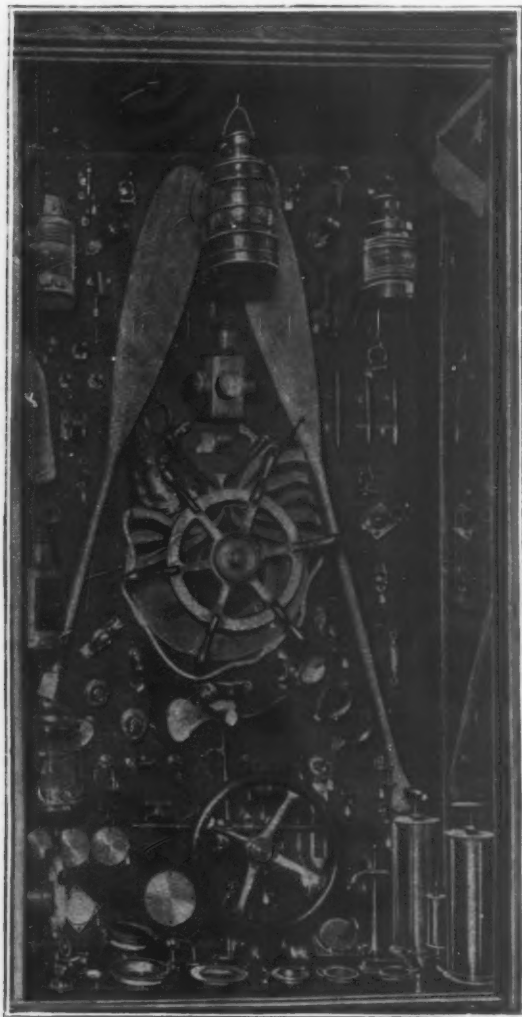
EAGLE MFG. COMPANY, Kansas City, Mo.: Catalogue devoted to Stalk Cutters, Listers, Cultivators, Plows, Harrows, Planters, Double Shovels, Wheel Rakes, Stackers, Hay Loaders and Pressers, Lifting Jacks, Farm Trucks and Wagons, &c. The catalogue is accompanied by repair list No. 32.

J. R. TERRILL, traveling representative of Caverhill, Learmont Company, Montreal, and a summer resident of Ahuntsic, P. Q., a beautiful suburb about 15 miles from Montreal, has been elected and sworn in as a town councillor for that municipality.

## THE SALE OF MOTOR BOAT FITTINGS IN HARDWARE STORES.

**T**HE remarkable development of the power boat within recent years has been accompanied by a reduction in the cost of Engines to a point where few dwellers on sea coast, lake or river need forego the pleasure of owning one. If a man cannot own and operate an expensive high speed Launch, he can get a great deal of fun and healthful relaxation out of a small open Boat or Dory, with a "kicker" in it, which, all complete, need not cost more than \$125 to \$150. Motor boating has thus been popularized, while there are few working or fishing Boats nowadays that are not supplied with Engines.

This development—it is probably something more than a fad or craze—has opened a source of profitable busi-



Wall Case Display of Motor Boat Fittings.

ness, which retail Hardware merchants have, fortunately, not been slow to see and take advantage of. As a result many who are situated in boating districts are now carrying excellent stocks of Motor Boat Fittings, which are profitable in themselves, and not only add to the attractiveness of the stores, but indirectly lead to a considerable increase in the sale of other lines.

### Revenue for Hardwaremen.

N. T. Bushnell Company, New Haven, Conn., is a house which is now doing a large business along this line. Mr. Burchell, the president of the company, is identified with the New Haven Yacht Club, and the store has come to be regarded as local headquarters, not only for Motor Boat Supplies, but for Sail Boat equipment and all yachting accessories.

Tracy, Robinson & Williams, Hartford, Conn., is an-

other Hardware firm which is featuring Motor Boat Supplies, its glass front wall case filled with samples being illustrated in the accompanying cut. This case is near the entrance of the store and presents a very handsome appearance. In its show window the firm has hanging from the ceiling, high enough not to interfere with the view of goods shown on the window floor, three different kinds of mooring buoys, a can, a bucket and a cork buoy. When boating is out of season the wall case illustrated is occupied by Tools and other Hardware lines.

### Wall Case Display.

It is a noticeable fact that few of the merchants who are handling Motor Boat Fittings and Supplies have taken up the sale of Engines. Here and there is one who, through the operation of a small machine shop or because of a mechanical turn of mind in himself or in one of his employees, finds it possible to handle this machinery to advantage, but inquiry develops the opinion that Hardwaremen as a rule cannot advantageously do so. As one merchant puts it, "When you sell a man an Engine he owns you forever after. If it goes wrong for any reason, not excepting ignorant and careless handling, it is your fault, and you must satisfy him at any cost or lose his trade. Moreover, to handle Engines you must employ one or more high priced mechanical men, whose salaries smother all the profits of the business. No, sir! Let the machine-shops sell the Engines. I'll take the pickings."

### Trouble in Engines.

## TRADE ITEMS.

THE factory of the Utica Drop Forge & Tool Company, Utica, N. Y., was destroyed by fire on the 28th ult. The property was covered with an insurance of over \$200,000. Plans have already been made and contracts let for the reconstruction and equipment of the plant. The new factory will have nearly twice the floor area of the one destroyed, and the capacity for the delivery of Tools will also be largely increased. The company expects to be able to ship Tools to its customers for the fall trade by September 1.

BALDWIN, ROBBINS & Co., Hardware jobbers, whose stock was almost totally destroyed by fire a few months since, have resumed business at the old stand, 103-105 Pearl street, Boston, Mass. The building has been restored and remodeled and a complete stock of goods put in.

THE F. W. GESSWEIN COMPANY, 39 John street, New York, manufacturer, jobber and importer of fine Tools and Supplies for jewelers, opticians, engravers, silver-smiths, metal workers and dental specialists, will, on January 1 next, change its name to William Dixon, Incorporated. The management will be the same as for the last 16 years. The business was originally established in 1868 and was incorporated in 1896.

THE business of D & H. Scovil, Higganum, Conn., manufacturers of Planters' Hoes, has been incorporated under Connecticut laws as D & H. Scovil, Inc., with a paid in capital stock of \$100,000. The incorporators are Joseph Porter, New Haven, Wallace Porter, Haddam, Conn., and Joseph Scovil Porter, Middletown, Conn. The incorporation means nothing excepting the change of name, the ownership and management remaining as it has been for a number of years.

THE large establishment of W. K. Morison & Co., Minneapolis, Minn., has been badly damaged by fire. The stock is valued at \$170,000, insurance being carried to the amount of \$140,000. We are advised that the insurance approximately covers the loss. Inasmuch as all catalogues and other trade literature were destroyed the firm will value copies of latest catalogues and price-lists with quotations.

McNeil & Smith Hardware Company, Haskell, Texas, has been incorporated with a capital of \$25,000. N. McNeil is president; A. J. Smith, secretary and manager, and R. C. Montgomery, treasurer.

**A. J. HARWI COMPANY.**

**THE A. J. HARWI HARDWARE COMPANY**, Atchison, Kan., is now in complete possession of its new four-story and basement brick building. It is a thoroughly modern structure and contains 52,500 sq. ft. of floor space. There is also a separate warehouse containing 23,100 sq. ft. This is the fourth home of the business since its establishment by A. J. Harwi, president of the present organization, August 22, 1875. The new building has 75 ft. frontage on Commercial street and 140 ft. depth on Ninth street, and is so located that railroad cars can be run in on a spur track and unloaded directly upon the house platform. The basement, with concrete floor, is 10 ft. deep, and the first floor 16 ft. to ceiling. The company also owns an additional 45 ft. frontage on Commercial street, adjoining, for future expansion. The building has electric freight elevators, automatic sprinkler system, elevator fire doors, steam heat, intercommunicating telephone system and a main office 40 x 60 ft., besides a private office for the president and three vaults.

The company employs 14 traveling representatives, who cover portions of Nebraska, Colorado, Oklahoma and the Indian Territory, besides all of Kansas. The first year's business amounted to \$14,000; last year three-quarters of a million dollars worth of goods were sold. The other officers of the company are: Wilson H. Harwi, a brother of the president, who is treasurer, and Frank E. Harwi, secretary, son of A. J. Harwi.

**AMONG THE HARDWARE TRADE.**

E. J. Scholl has opened a store in Paul, Neb., and will carry Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils and Saddlery.

W. O. Skaggs has succeeded Skaggs & Gorman in Allen, Kan., and will handle Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils, Sporting and Athletic Goods, Harness, Saddlery and Vehicles.

Hicks & Phelps have succeeded Chas. E. Hicks in Bladen, Neb., and will carry Shelf and Heavy Hardware, Stoves, Tinware, Paints, Oils, Sporting and Athletic Goods.

The interest of Sidnam Brothers in the Fargo Hardware Company, Fargo, N. D., has been purchased by Houston & Phinney, who own and operate three Hardware stores in the Northwest.

The Champion Supply & Hardware Company, Springfield, Ohio, has been incorporated with a capital stock of \$10,000, the incorporators including R. A. Stewart and L. P. Schaefer.

W. E. Good, Kewanee, Ill., dealer in Hardware and Agricultural Implements, has removed from his location on Tremont street to the new Redman Building on Main street, where his business will be accommodated in more commodious quarters.

W. A. Roberts, who has been traveling for the Belknap Hardware & Mfg. Co., has become associated with the Greensboro Mercantile Company, Greensboro, Ala., which will establish a complete Hardware department.

A. O. Boggs has purchased the general stock of J. C. Lamb in Williams, Neb., which includes Hardware.

J. D. London has opened a new store in Rufus, Ore., and will handle Shelf Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils, Sporting and Blacksmithing Goods.

A consolidation of the firms of J. J. Penhallegon and the J. J. Penhallegon Heating & Plumbing Company, Mineral Point, Wis., has been effected by the organization of the J. J. Penhallegon Company, under which name the

merged interests of the two companies are now operated. The J. J. Penhallegon Company will deal in Hardware, Stoves, Ranges and Paints, and will do all kinds of steam and hot water heating and sanitary plumbing. A very attractive showroom has been fitted up for the display of Plumbing Supplies and Fixtures. The officers of the company are: J. J. Penhallegon, president; Ethelbert Bennett, vice-president; L. Roy Penhallegon, secretary and treasurer.

Charles E. Campbell, Centralia, Mo., has purchased the Hardware business of L. O'Neal, and will carry a stock of Shelf and Builders' Hardware, Stoves, Tinware and Sporting Goods.

H. N. Thomson, Dallas, Texas, has been succeeded by H. N. Thomson Hardware Company, which has been incorporated with a capital of \$30,000. The officers of the company are: President, H. N. Thomson; vice-president, J. E. Randall; secretary, C. Emery.

A. J. Inman Company has purchased the business of Oylear Bros., in Leland, Idaho, and will continue the retail business in Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils and Sporting Goods.

C. Hudec & Co. have succeeded Hudec, Boyd & Co., in Walthill, Neb., and will carry Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils, Sporting Goods, Furniture and Harness. The firm also has a plumbing department.

The Humphrey-Daggett Hardware Company, Whittier, Cal., has begun work on plans that include enlargement and improvement of its present quarters. A brick addition, 25 x 48 ft., with basement and elevator, will take the place of the present temporary iron structure. This room will be entirely devoted to the plumbing and tinning department. The main salesroom will also be enlarged and rearranged to admit of better display. H. E. Humphrey, president of the company, is also president of the Southern California Hardware & Implement Association.

W. A. & J. H. Reed have purchased the store of Wm. M. Ream in Springfield, Mo. The firm handle Hardware, Harness, Glass, Sporting Goods, Tools and Cutlery.

Jackson Bros. Company has succeeded to the business of Jackson Bros. & Bonner Hardware Company in Mexia, Texas. The company conduct a wholesale and retail business, carrying a general line of Hardware, Saddlery, &c.

The store of Kennedy and Derby, Portland, Mich., was recently damaged by fire to the extent of \$15,000. The firm carry Shelf and Heavy Hardware, Stoves, Tinware, Paints, Oils and Sporting Goods.

Wenk & Hoesly, Leigh, Neb., have added a furniture department to their Hardware business.

The Jones Hardware Company, Dalhart, Texas, doing both a wholesale and retail business, has been incorporated with a capital stock of \$20,000.

O. N. Walter, Elk Point, S. D., whose Hardware store was recently completely destroyed by fire, was, by energetic action, able to resume business in a new location within three days.

G. H. Busse has purchased the business of the Decatur Hardware & Implement Company, Decatur, Neb., and will carry a line of Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils and Sporting Goods. The business will be conducted under the same name as heretofore.

H. N. Thompson Hardware Company, successor to H. N. Thompson, Dallas, Texas, has been incorporated with a capital stock of \$30,000. The company handles Shelf Hardware, Stoves and Tinware, at wholesale and retail.



## REQUESTS FOR CATALOGUES, &c.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

**REQUESTS** for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM T. G. LYON, who has moved his stock from West Line to Cleveland, Mo. He handles Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils and Vehicles. He is carrying a larger stock than formerly.

FROM WEINHOLD-HUEY HARDWARE COMPANY, Seventh and Minnesota avenues, Kansas City, Mo., handling Builders' Hardware, Tools, Cutlery, Firearms, Gas Fixtures, Sporting and Athletic Goods, Housefurnishings, Tin and Enameled Ware, Paints, &c.

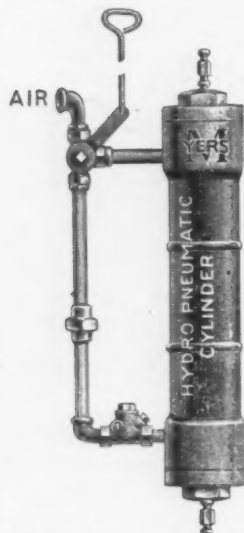
FROM STRAWN & WILKINS, who have purchased the Hardware store of W. H. H. Bonebrake & Son in Marion, Iowa, and will carry Shelf and Heavy Hardware, Stoves, Tinware, Paints, Oils and Sporting Goods. The firm will also conduct a tin shop and do furnace work.

FROM MCGREGOR & CAMPBELL, Chesaw, Wash., whose store has been destroyed by fire. The firm will erect a new building, 30 x 110 ft., putting in a \$20,000 stock instead of \$9000 as heretofore. The firm handles Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils, Sporting Goods and Harness.

FROM J. B. GILLIGAN, Bloomington, Wis., who has purchased the Hardware, Stove, Paint and Sporting Goods store of R. W. Hedeman.

## The Myers Hydro-Pneumatic Cylinder.

The accompanying cut represents a hydro-pneumatic cylinder, complete, put on the market by F. E. Myers & Bro., Ashland, Ohio. It is remarked by the manufacturers that the development of individual water systems for private residences, summer resorts, hotels, &c., has created a demand for a pump that will supply air at the same time that it is pumping water, the air being used as an elastic pressure to drive the water to any part of the system. The cylinder shown is designed to accomplish this result. It can be used in connection with any underground three-way pump, and should be located immediately below the pump proper, so as to be always within easy reach. The principle of the cylinder is such that it has a capacity of about one-third more area than the water cylinder located below it. Hence this one-third of the capacity of the pneumatic cylinder not being supplied by the water cylinder, supplies itself with air taken through the air pipe. When the pump is not required to pump air it can be shut off by means of a lever extending to the base. The lever is lowered to pump air and raised to cut out the air. When the air is shut off this extra area of the pneumatic cylinder must be supplied by some means, and to provide for this the cylinder is fitted with a by-pass taken from the upper part of the cylinder above the plunger, through which by-pass the extra requirement is supplied from the discharge. In this way the amount of water that is supplied by the lower pumping cylinder is not detracted from, but instead, the air cylinder, under these circumstances, simply acts as a part of the discharge pipe. The



The Myers Hydro-Pneumatic Cylinder.

air cylinder is fitted with a simple plunger only. The check valve for the air pipe is located on the outside of the cylinder and is easily reached in case of repairs. The by-pass from above the plunger is controlled by a lever from the base, by raising or lowering which this by-pass is opened to allow the water to pass, or is closed to allow the air to be pumped into the cylinder, and hence into the tank through the discharge pipe. A 3-in. hydro-pneumatic cylinder is made to be used in connection with a 2½-in. lower pumping cylinder, and a 3½-in. hydro-pneumatic cylinder to be used in connection with a 3-in. lower pumping cylinder.

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## Kemper Disk Furrow Opener.

Walker Mfg. Company, Council Bluffs, Iowa, has improved its furrow opener as shown in Fig. 1 of the accompanying cuts. It can be attached to any make of planter, and works as shown in Fig. 2. It is quickly and easily put on, can be adjusted to run deep or shallow

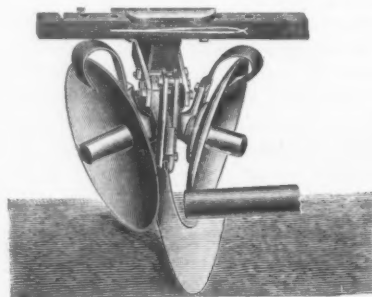


Fig. 1.—Kemper Disk Furrow Opener.

and adds very little to the draft of the planter. The opener is made in three sizes with 10, 12 and 14 in. disks. The manufacturer states that it removes all clods, young weeds, trash, &c., from the corn row and makes a clean, mellow seed bed in which to drop the corn; that it produces a better stand and an increased yield by planting each hill the same depth; that it leaves each kernel of

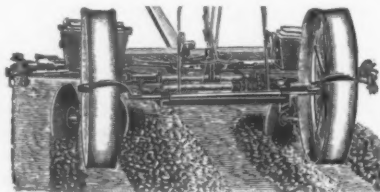


Fig. 2.—Disk Furrow Opener in Operation.

corn covered just deep enough to germinate and come up quickly, and yet, when cultivated, it is left deep in the ground, insuring a better and stronger growth; that it cultivates the ground as the corn is planted, destroying all young weeds, grass, cut worms, bugs and other insects, and that it will increase the yield from 8 to 25 bushels per acre.

## Eye Glass and Pocket Screw Drivers.

The L. S. Starrett Company, Athol, Mass., and 132 Liberty street, New York, has added to its lines of fine



Fig. 1.—Screw Driver for Eye Glasses.

tools the small screw drivers here illustrated, actual size. Fig. 1 shows a screw driver, No. 556, for use in tightening screw in eye glass frames. Loosened screws in such

instances are of common occurrence and can be quickly adjusted by this handy little high grade pocket tool, which is entirely safe to carry in vest pocket, purse, on key ring or as a charm on watch chain, the upper cut reproducing actual appearance and the detached cut showing both parts when needed for use. The blade in this tool is a fixed part of the detachable portion, which, after use, is screwed into position again. Fig. 2



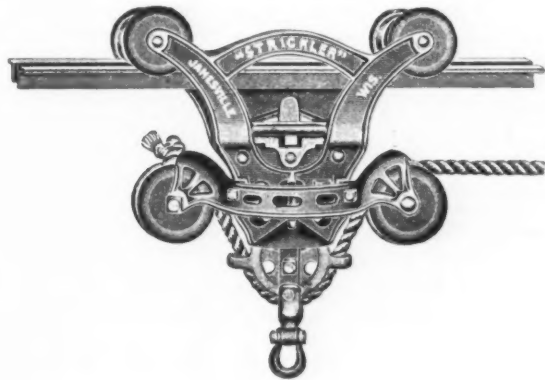
Fig. 2.—Pocket Screw Driver, Reversible Blade.

is a pocket screw driver, No. 554, which is suitable for the same or similar purposes. This one is made with a chuck to hold the detachable blade firmly in a split socket when in use. To carry about, the blade may be removed by slightly loosening the chuck, then reversing and telescoping through the socket nearly the full length of blade and held securely by retightening the chuck. Both screw drivers are finely made and nickel plated.

### The Strickler Improved Reversible and Swivel Steel Track Carrier No. 7.

An improved carrier, which is made by the Strickler Hay Tool Company, Janesville, Wis., is shown in Fig. 1. New features have been introduced into the make-up of the carrier, which are represented as being distinct improvements. By reason of its reversible and swivel action loads can be drawn over a high beam or a nearly filled mow without causing the carrier to tip or bind on the track, and it also prevents the annoyance that would otherwise be caused by the twisting of the rope when a load is being drawn up to the carrier. This is accomplished through the use of the lock and pulley, A and B, Fig. 2, which allows the load to swing and revolve, and is so constructed that it can enter the bell shaped opening of the carriers at almost any angle without tilting the carrier. When the fork pulley is raised and strikes the lock jaws in the carrier, which in A are shown in open position, the key or wedge between the upper prongs drops down and securely locks the jaws in the eye of the pulley, as shown in B. The fork pulley with its load is

automatically released when the carrier strikes the stop lock on the track by means of which the key or wedge is raised, opening the jaws at the bottom and allowing the



The Strickler Improved Reversible and Swivel Steel Track Carrier No. 7.

fork pulley to drop out. The tool is constructed of malleable iron throughout, and is provided with large track

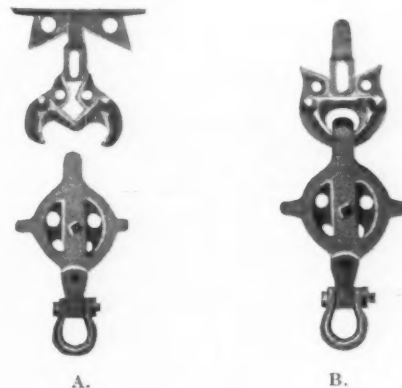


Fig. 2.—Lock and Pulley of Carrier.

wheels mounted on steel turned pins. The carrier is strong enough for use with either fork or sling, and weighs 30 lb.

## PAINTS, OILS AND COLORS

### Animal, Fish and Vegetable Oils—

Linseed, City, raw.....	45	@ 46
City, Boiled.....	46	@ 47
State and Western, raw.....	44	@ 45
Raw, Calcutta, in bbls.....	70	@ 71
Lard, Extra Prime, Winter.....	77	@ 78
Extra No. 1.....	57	@ 58
No. 1.....	49	@ 50
Cotton-seed, Crude, f.o.b. mills.....	31	@ 32
Summer Yellow, Prime.....	58	@ 59
Summer White.....	62	@ 63
Yellow Winter.....	62	@ 63
Sperm, Crude.....	59	@ 60
Natural Winter.....	72	@ 73
Bleached Winter.....	75	@ 76
Bleached Winter, Extra.....	60	@ 61
Tallow, Prime.....	60	@ 61
Whale, Crude.....	35	@ 36
Natural Winter.....	46	@ 47
Bleached Winter.....	48	@ 49
Extra Bleached Winter.....	50	@ 51
Menhaden, Brown, Strained.....	32	@ 33
Light Strained.....	26	@ 27
Northern.....	26	@ 27
Southern.....	26	@ 27
Cocoonut, Ceylon.....	9	@ 9 1/4
Cochin.....	10 1/4	@ 10 1/2
Cod, Domestic, Prime.....	36	@ 37
Newfoundland.....	40	@ 41
Red, Elaine.....	48	@ 49
Saponified.....	7	@ 7 1/4
Olive, Italian, bbls., Yellow.....	85	@ 86
Neatsfoot, Prime.....	56	@ 57
Palm, Logos.....	7	@ 7 1/4

### Mineral Oils—

Black, 29 gravity, 25@30 cold test.....	12 1/4	@ 13
29 gravity, 15 cold test.....	13	@ 13 1/4
Summer.....	12	@ 12 1/2
Cylinder, light filtered.....	19	@ 20
Dark, filtered.....	16 1/2	@ 17 1/2
Paraffine, 903-907 gravity.....	13	@ 13 1/2
903 gravity.....	13	@ 13 1/2
903 gravity.....	10 1/4	@ 11 1/4
Red.....	13	@ 14 1/2

### Miscellaneous—

Barytes:		
White, Foreign.....	100 lb	\$18.50 @ 20.50
Amer. floated.....	100 lb	19.00 @ 20.00
Off color.....	100 lb	13.00 @ 16.50
Chalk, in bulk.....	100 lb	3.00 @ 3.25
In bbls.....	100 lb	3.00 @ 3.25
China Clay, Imported.....	100 lb	11.00 @ 17.50
Cobalt, Oxide.....	100 lb	2.50 @ 2.60
Whiting, Commercial.....	100 lb	43 @ 52
Gilders.....	100 lb	55 @ 65
Ex. Gilders.....	100 lb	60 @ 65

### Putty, Commercial—

In bladders.....	100 lb	\$1.70 @ 1.85
In bbls. or tubs.....	100 lb	1.20 @ 1.45
In 1 lb to 5 lb cans.....	100 lb	2.65 @ 2.95
In 12 1/2 to 50 lb cans.....	100 lb	1.50 @ 1.90

### Spirits Turpentine—

In Oil bbls.....	60	@ 61
In machine bbls.....	60 1/2	@ 61
Glue—		
Cabinet.....	12	@ 15
Common Bone.....	7 1/2	@ 9
Extra White.....	18	@ 24
Foot Stock, White.....	12	@ 14
Foot Stock, Brown.....	9	@ 11
German Hide.....	12	@ 18
French.....	10	@ 16
Low Grade.....	10	@ 12
Medium White.....	11	@ 17

### Gum Shellac—

Bleached, Commercial.....	44	@ 45
Bone Dry.....	53	@ 54
Button.....	40	@ 60
Diamond I.....	30	@ 60
Fine Orange.....	32	@ 57
A. C. Garnet.....	35	@ 46
Kala Button.....	35	@ 36
D. C.....	62	@ 63
Octagon B.....	56	@ 57
T. N.....	44	@ 46
V. S. O.....	50	@ 60

### Colors in Oil—

Black, Lampblack.....	12	@ 14
Blue, Chinese.....	36	@ 46
Blue, Prussian.....	32	@ 36

### White Lead, Zinc, &c.—

Lead, English white, in Oil.....	10 1/4	@ 10 1/2
Lead, American White:		
Lots of 500 lb or over, in Oil.....	7 1/4	@ 7 1/2
Lots less than 500 lb, in Oil.....	8	@ 8 1/2
Lead, White, in oil, 25 lb tin		
pails, add to keg price.....	3	@ 4
Lead, White, in oil, 12 1/2 lb tin		
pails, add to keg price.....	1	@ 1 1/2
Lead, White, in oil, 1 to 5 lb		
assorted tins, add to keg price.....	1 1/4	@ 1 1/2
Lead, American, Terms: For lots 12		
tons and over 1/4¢ rebate; and 2% for		
cash if paid in 15 days from date of		
invoice; for lots of 500 lbs. and over		
2% for cash if paid in 15 days from		
date of invoice, for lots of less than		
500 lbs. net.....	5 1/2	@ 5 3/4

### Zinc, American, dry.....

### Zinc, French:

### Antwerp, Red Seal, dry.....

### Antwerp, Green Seal, dry.....

### Paris, Red Seal, dry.....

### Paris, Green Seal, dry.....

### Zinc, V. M. French, in Poppy Oil:

### Green Seal:

### Lots of 1 ton and over.....

### Lots of less than 1 ton.....

### Zinc, V. M. French, in Poppy Oil:

### Red Seal:

### Lots of 1 ton and over.....

### Lots of less than 1 ton.....

### Discounts—French Zinc—Discounts

### to buyers of 10 bbl. lots of one or mixed

### grades, 1%: 25 bbls., 2%: 50 bbls., 4%.

### Dry Colors—

### Black, Carbon.....

### Black, Drop, American.....

### Black, Drop, English.....

Black, Ivory.....	16	@ 20
Lamp, Com.....	4	@ 6
Blue, Celestial.....	4	@ 6
Blue, Chinese.....	30	@ 33
Blue, Prussian.....	28	@ 32
Blue, Ultramarine.....	3 1/2	@ 15
Brown, Spanish.....	1 1/2	@ 1
Carmine, No. 40.....	3.10	@ 3.25
Green, Chrome, ordinary.....	3 1/2	@ 7
Green, Chrome, pure.....	17	@ 25
Lead, Red, bbls., 1/2 bbls., kegs.....	7 1/4	@ 7 1/2
Litharge, bbls., 1/2 bbls., kegs.....	7 1/4	@ 7 1/2
Ocher, American.....	100 lb	\$8.50 @ 10.00
American Golden.....	2 1/2	@ 3 1/4
French.....	1 1/4	@ 2
Foreign Golden.....	3	@ 4
Orange Mineral, English.....	10	@ 12
French.....	11 1/4	@ 12
German.....	10	@ 12
American.....	8 1/4	@ 9
Red, Indian, English.....	4 1/2	@ 6
American.....	3	@ 3 1/4
Red, Turkey, English.....	4	@ 10
Red, Tuscan, English.....	7	@ 10
Red, Venetian, Amer.....	100 lb	\$0.50 @ 1.25
English.....	100 lb	\$1.15 @ 1.60
Sienna, Italian, Burnt and		
Powdered.....	3	@ 9
Italian, Raw, Powdered.....	3	@ 7
American, Raw.....	1 1/4	@ 2
American Burnt and Pow'd.....	1 1/4	@ 2
Talc, French.....	100 lb	\$18.00 @ 25.00
American.....	100 lb	15.00 @ 25.00
Terra Alba, French.....	100 lb	9.00 @ 1.00
English.....	3	@ 7
American.....	100 lb	8.00 @ 1.00
American.....	100 lb	No. 1, 7.50 @ .80
American.....	100 lb	No. 2, 6.00 @ .65
Umber, T'key, Bnt. & Pow'd.....	2	@ 3 1/4
Burnt, Raw and Powdered.....	2 1/4	@ 3 1/2
Burnt, American.....	1 1/4	@ 2
Raw, American.....	1 1/4	@ 2
Yellow Chrome, Pure.....	12	@ 16
Vermilion, American Lead.....	7	@ 25
Quicksilver, bulk.....	65	@ 6
Quicksilver, bags.....	2	@ 2 1/2
English, Imported.....	65	@ 70
Chinese.....	90	@ 1.00

# Current Hardware Prices.

**General Goods.**—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

**Special Goods.**—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

**Range of Prices.**—A range of prices is indicated by means of the symbol @. Thus 33 1/2 @ 33 1/2 & 10% signifies

that the price of the goods in question ranges from 33 1/2 per cent. discount to 33 1/2 and 10 per cent. discount.

**Names of Manufacturers.**—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1906, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

**Standard Lists.**—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

**Additions and Corrections.**—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

## Adjusters, Blind—

Columbian and Domestic.....33 1/2 %  
North s.....10 %  
Zimmerman's—See Fasteners, Blind.

## Window Stop—

Ives' Patent.....35 %  
Taplin's Perfection.....35 %

## Ammunition—See Caps, Cartridges, Shells, &c.

## Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, 1/2 doz. pairs, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

## Anvils—American—

Eagle Anvils.....1/2 lb @ 8 1/2 %  
Hay-Budden, Wrought.....1/2 lb @ 9 1/2 %  
Trenton.....1/2 lb @ 9 1/2 %

## Imported—

Peter Wright & Sons, 1/2 lb, 84 to 349 lb, 11 1/2 %; 350 to 600 lb, 11 1/2 %

## Anvil, Vise and Drill—

Millers Falls Co., \$18.00.....15 1/2 %  
Apple Parers—See Parers, Apple, &c.

## Aprons, Blacksmiths'—

Livingston Nail Co.....33 1/2 %

## Augers and Bits—

Com. Double Spur.....70 1/2 @ 10 1/2 %  
Jennings' Patn., reg. finish.....60 1/2 @ 10 1/2 %

## Black Lip or Blued—

Boring Mach. Augers.....70 1/2 %  
Car Bits, 12-in. twist.....40 1/2 %  
Ford's Auger and Car Bits.....40 1/2 %  
Ft. Washington Auger Co., Concord's.....35 %  
Forster Pat. Auger Bits.....25 %  
C. E. Jennings & Co., No. 10 ext. lip, R. Jennings' list.....25 1/2 %

## Augers and Bits—

No. 30, R. Jennings' list.....50 %  
Russell Jennings.....25 1/2 @ 10 1/2 %  
L'Hommedieu Car Bits.....15 %  
Mayhew's Countersink Bits.....45 %  
Pugh's Black.....30 %  
Pugh's Jennings' Pattern.....60 %  
Snell's Auger Bits.....60 %  
Snell's Bell Hangers' Bits.....60 %  
Snell's Car Bits, 12-in. twist.....60 %  
Snell's King Auger Bits.....50 %  
Wright's Jennings' Bits.....50 %

## Bit Stock Drills—

See Drills, Twist.

## Expansive Bits—

Clark's small, 1/8; large, 3/16.....60 1/2 @ 10 %  
Clark's Pattern, No. 1, 1/2 doz. 2 1/2 %  
No. 2, 1 1/2.....60 1/2 @ 10 %  
Ford's, Clark's Pattern.....60 1/2 @ 10 %  
C. E. Jennings & Co., Steer's Patn., 2 1/2 %  
Lavigne Pat., small size, 1/8; 100; large size, 3/16.....60 1/2 @ 10 %  
Swan's.....60 %

## Gimlet Bits—

Per gro.  
Common Dble. Cut.....\$3.00 @ 3.25  
German Pattern, Nos. 1 to 10, 1/4; 11 to 13, 5/75

## Hollow Augers—

Bonney Pat., per doz. \$6.50 @ 7.00  
Ames.....20 1/2 %  
Universal.....20 %  
Wood's Universal.....25 %

## Ship Augers and Bits—

Ship Augers.....40 1/2 @ 10 %  
Ford's.....33 1/2 @ 10 %  
C. E. Jennings & Co., L'Hommedieu's.....6 %  
Watrous'.....33 1/2 @ 10 %  
Snell's.....40 %

## Awl Hatts—See Handles, Mechanics' Tool, Awls—

Brad Awls:  
Handled.....gro. \$2.75 @ 3.00  
Unhdd, Shldered.....gro. 65 @ 66 1/2  
Unhdd, Patent.....gro. 66 @ 70 1/2  
Peg Awls:  
Unhdd, Patent.....gro. 51 @ 54 1/2  
Unhdd, Shldered.....gro. 65 @ 70 1/2  
Scratch Awls:  
Handled, Com.....gro. \$3.50 @ 4.00  
Handled, Socket.....gro. \$11.50 @ 12.00

## Awl and Tool Sets—See Sets, Awl and Tool.

## Axes—

Single Bit, base weights: Per doz.  
First quality.....\$4.75 @ 5.00  
Second quality.....\$4.25 @ 4.50

Double Bit, base weights:  
First quality.....\$4.90 @ 5.25  
Second quality.....\$4.50 @ 4.75

## Axle Grease—

See Grease, Axle Iron or Steel

## Axles—

Concord, Loose Collar.....4 1/2 @ 5 1/2 %  
Concord, Solid Collar.....4 1/2 @ 5 1/2 %  
No. 1 Common, Loose.....3 1/2 @ 4 1/2 %  
No. 1 1/4 Common, New Styles.....4 1/2 @ 5 1/2 %  
No. 2 Solid Collar.....3 1/2 @ 4 1/2 %  
Half Patent.....70 @ 75 %

Nos. 7, 8, 11 and 12.....70 @ 75 %  
Nos. 13 to 14.....70 @ 75 %  
Nos. 15 to 18.....75 @ 75 %  
Nos. 19 to 22.....75 @ 75 %

## Boxes, Axle—

Common and Concord, not turned lb., 4 1/2 @ 5 1/2 %  
Common and Concord, turned lb., 5 1/2 @ 6 %  
Half Patent.....lb., 9 1/2 @ 10 1/2 %

## Bait—

Fishing—  
Hendryx:  
A Bait.....20 %  
B Bait.....25 %  
Competitor Bait.....20 1/2 %

## Balances—

Sash—  
Caldwell new list.....50 %  
Pullman.....50 1/2 @ 60 %

## Spring—

Spring Balances.....50 1/2 @ 60 %  
Chatillon's:  
Light Spg. Balances.....50 1/2 @ 60 %  
Straight Balances.....40 1/2 @ 50 %  
Circular Balances.....50 1/2 @ 60 %  
Large Dial.....30 %

## Barb Wire—See Wire, Barb.

## Bars—

Crow—  
Steel Crowbars, 10 to 40 lb.....per lb., 2 1/4 @ 3 1/2 %  
No. 10 Ideal, Nickel Plate.....gro. \$4.50

## Towel—

No. 10 Ideal, Nickel Plate.....gro. \$4.50

## Beams, Scale—

Scale Beams.....40 %  
Chatillon's No. 1.....30 %  
Chatillon's No. 2.....40 %

## Beaters, Carpet—

Holt-Lyon Co.:  
No. 12 Wire Coppered 1/2 doz. \$0.80;  
Tinned.....\$0.85  
No. 11 Wire Coppered 1/2 doz. \$1.15;  
Tinned.....\$1.20  
No. 10 Wire Tinned.....1/2 doz. \$1.50  
Western W. G. Co.:  
No. 1 Electric.....1/2 doz. \$7.80  
No. 2 Buffalo.....1/2 doz. \$9.00  
No. 3 Perfection Dust.....1/2 doz. \$5.00

## Egg—

Holt-Lyon Co.:  
Holt, per doz. No. 5, Jap'd, \$0.80;  
No. A, Jap'd, \$1.15; No. B, Jap'd, \$1.85; No. 6, Jap'd, \$1.65.  
Lyon, Jap'd, per doz., No. 2, \$1.35.

## Taplin Mfg. Co.: Improved Dover, per gro., No. 60, \$6.00; No. 75, \$6.50; No. 100, \$7.00; No. 102, Tin'd, \$8.50; No. 150, Hotel, \$15.00; No. 152, Hotel Tin'd, \$17.00; No. 200, Tumbler, \$3.50; No. 202, Tumbler Tin'd, \$3.50; No. 300, Mammoth, per doz., \$25.00.

Tanner & Seymour Mfg. Co.:  
T. & S. Dover.....\$6.00  
Western W. G. Co., 1/2 doz., Buffalo, No. 2, \$8.00; Perfection, No. 3, \$5.00.  
Wonder (R. M. Co.).....1/2 doz. net, \$8.40

## Bellows—

Blacksmith, Standard List.....60 1/2 @ 65 %  
Grain Leather.....50 @ 50 1/2 %

## Hand—

Inch.....6 2 8 9 10  
Doz.....\$5.00 5.50 6.00 6.50 7.50

## Molders—

Inch.....10 12 14 16  
Doz.....\$7.50 9.00 12.00 15.00

## Bells—

Ordinary Goods.....75 1/2 @ 75 1/2 %  
High grade.....70 1/2 @ 75 %  
Jersey.....75 1/2 @ 10 %  
Texas Star.....50 %

## Door—

Barton Gong.....35 @ 40 %  
Home, R. & E. Mfg. Co.'s.....55 @ 10 %

Polished, Brass.....50 @ 50 1/2 %  
White Metal.....50 @ 50 1/2 %  
Nickel Plated.....40 1/2 @ 50 %  
Stainless.....50 1/2 @ 50 1/2 %  
Cone's Globe Hand Bells.....33 1/2 @ 35 %

## Miscellaneous—

Farm Bells.....lb., 2 1/2 @ 2 1/2 %  
Church and School.....60 @ 60 1/2 %

## Belting—

Leather—  
Extra Heavy, Short Lap.....60 1/2 %  
Regular Short Lap.....60 1/2 @ 65 %  
Standard.....70 1/2 %  
Light Standard.....75 %  
Cut Leather Lacing.....40 1/2 %  
Leather Lacing Strips, per sq. ft. 25 1/2

## Rubber—

Agricultural (Low Grade).....75 @ 75 1/2 %  
Common Standard.....70 @ 70 1/2 %  
Standard.....70 @ 70 1/2 %  
Extra.....60 1/2 @ 60 1/2 %  
High Grade.....50 1/2 @ 50 1/2 %

## Bench Stops—

See Stops, Bench

## Benders and Upsetters, Tire—

Detroit Perfected Tire Bender.....40 %  
Detroit Stoddard's Lightning Tire Upsetters, No. 1, \$4.25; No. 2, \$7.25; No. 3, \$10.50; No. 4, \$18.25; No. 5, \$25.00.  
Green River Tire Benders and Upsetters.....20 %

## Bicycle Goods—

John S. Leng's Son & Co.'s 1907 list:  
Chain, Parts, Spokes.....50 %  
Tubes.....60 %

## Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See Augers and Bits.

## Blocks—

Tackle—  
Common Wooden.....75 %  
B. & L. B. Co.:  
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50 1/2 %; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50 1/2 %;



dendryx Bronze; Series 700, 800, 30.  
dendryx Enamelled.....35.

**Calipers—See Compasses.****Calks, Toe and Heel—**

Blunt, 1 prong, per lb., 4.15 @ 4.35  
Sharp, 1 prong, per lb., 4.15 @ 4.35  
Burr's Blunt, 3/4 in. @ 4.15; Sharp, 3/4 in. @ 4.15  
Cutler, Blunt, 4 in. @ 4.15; Sharp, 4 in. @ 4.15  
Cutler's, Blunt, 1/2 in. 3.65; Sharp, 4.15

**Can Openers—**

See Openers, Can.

**Cans, Milk—**

	5	10 gal.
Illinois Pattern.....	\$1.85	2.00
New York Pattern.....	2.15	2.40
Dubuque.....	1.85	2.00

**Cans, Oil—**

R. M. Co., Family, 1/2 gro., 2 5  
Empire.....\$21.00 \$33.00 \$56.00  
Buttalo.....\$66.00

**Caps, Percussion—**

Eley's E. B.....50 @ 55¢  
G. D.....per M 34 @ 35¢  
F. L.....per M 40 @ 42¢  
G. E.....per M 40 @ 50¢  
Musket.....per M 60 @ 65¢

**Primers—**

Berdan Primers, 2 per M.....20¢  
Primer Shells and Bullets.....15¢  
All other primers per M.....\$1.50 @ 1.60

**Carpet Stretchers—**

See Stretchers, Carpet.

**Cartridges—**

Blank Cartridges:  
32 C. F., \$5.50.....10¢  
38 C. F., \$7.00.....10¢  
22 cal. Rim, \$1.50.....10¢  
32 cal. Rim, \$2.75.....10¢  
B. B. Caps, Con. Ball, Sieged, \$1.50  
B. B. Caps, Round Ball.....1¢  
Central Fire.....25¢  
Target and Sporting Rifle.....15¢  
Primed Shells and Bullets.....15¢  
Rim Fire, Sporting.....50¢  
Rim Fire, Military.....15¢

**Castors—**

Bed.....6¢ @ 10¢  
Plate.....6¢ @ 10¢  
Philadelphia.....7¢ @ 10¢  
Acme, Ball Bearing.....35¢  
Buss.....10¢ @ 12¢  
Buss Anti-Friction.....70¢ @ 10¢  
Gem (Roller Bearing).....70¢ @ 10¢  
Steel Gem.....20¢  
Martin's Patent (Phoenix).....45¢  
Standard Ball Bearing.....45¢  
Tucker's Patent low list.....45¢  
Yale (Double Wheel) low list.....40¢ @ 10¢

**Cattle Leaders—**

See Leaders, Cattle.

**Chain, Proof Coil—**

American Coil, Straight Link:  
5-16 1/4 5-16 3/4 7-16 1/2 9-16  
\$3.77 6.17 5.92 4.37 4.37 4.27 4.22  
5/16 3/4 7/8 to 1 1/8 to 1 1/2 inch.  
\$4.7 4.97 4.92 4.12  
In cash lots, deduct 25¢.  
German Coil.....60¢ @ 10¢ @ 70¢

**Halter—**

Halter Chains.....60¢ @ 60¢ @ 5¢  
German Pattern Halter Chains  
List July 24, '97.....60¢ @ 10¢ @ 5¢  
Covert Mfg. Co.....35¢ @ 5¢

**Cow Ties—**

See Halters and Ties.

**Trace, Wagon, &c.—**

Traces, Western Standard: 100 pr.  
6 1/2-6-3, Straight, with ring, \$28.00  
6 1/2-6-2, Straight, with ring, \$29.00  
6 1/2-8-2, Straight, with ring, \$32.00  
6 1/2-10-2, Straight, with ring, \$37.00  
NOTE—Add 2¢ per pair for Hooks.  
Twist Traces: add per pair for Nos. 2 and 3, 2¢; No. 1, 3¢; No. 0, 4¢ to price of Straight Link.

Eastern Standard Traces, Wag-  
on Chain, &c.....60¢

**Miscellaneous—**

Jack Chain, list July 10, '93:  
Iron.....60¢ @ 10¢  
Brass.....50¢ @ 10¢  
Safety and Plumbers' Chain.....60¢ @ 10¢  
Gal. Pump Chain.....1/2 lb. 4¢ @ 10¢  
Covert Mfg. Co.:  
Breast, Halter, Heel, Rein, Stal-  
lion.....40¢  
Onaida Community:  
American Halter, Dog and Kennel  
Chains.....35¢ @ 2¢ @ 40¢  
Niagara Dog Leads and Kennel  
Chains.....45¢ @ 50¢ @ 5¢  
Wire Goods Co.:  
Dog Chain.....70¢  
Universal Dbl.-Jointed Chain.....50¢

**Chain and Ribbon, Sash—**

Onaida Community:  
Steel Chain.....60¢  
Pullman:  
Bronze Chain, 60%; Steel Chain.....60¢ @ 10¢  
Sash Chain Attachments, per set, 8¢  
Aluminum Sash Ribbon, per 100  
ft.....\$1.25 @ 33¢  
Sash Ribbon Attachments, per set, 8¢

**Chalk—(From Jobbers.)**

Carpenters' Blue.....50¢ @ 55¢  
Carpenters' Red.....30¢ @ 50¢  
Carpenters' White.....40¢ @ 45¢

**Checks, Door—**

Bardsley's.....15¢  
Pullman, per gro.....\$5.00  
Russwin.....33¢

**Chests, Tool—**

American Tool Chest Co.:  
Boys' Chests, with Tools.....50¢  
Youths' Chests, with Tools.....35¢  
Gentlemen's Chests, with Tools.....25¢  
Farmers' Carpenters' etc., Chests,  
with Tools.....21¢  
Machinists' and Pipe Fitter's  
Chests, Empty.....45¢  
Tool Cabinets.....45¢  
C. E. Jennings & Co.'s Machine-  
Tool Chests.....72¢

**Chisels—**

Socket Framing and Firmer  
Standard List.....70¢ @ 10¢ @ 75¢  
Buck Bros.....30¢  
C. E. Jennings & Co.:  
Socket Firmer No. 10.....25¢ @ 7 1/2¢  
Socket Framing No. 15.....25¢ @ 7 1/2¢  
Swan's.....66¢ @ 70¢  
L. & I. J. White Co.....30¢ @ 30¢ @ 5¢

**Tanged—**

Tanged Firmers.....30¢ @ 6¢ @ 35¢  
Buck Bros.....30¢  
C. E. Jennings & Co. Nos. 191, 181, 25  
L. & I. J. White Co.....25¢ @ 5¢  
**Cold—**  
Cold Chisels, good quality.....13¢ @ 15¢  
Cold Chisels, fair quality.....11¢ @ 12¢  
Cold Chisels, ordinary.....9¢ @ 10¢

**Chucks—**

Almond Drill Chucks.....35¢  
Almond Turret Six-T Chuck.....40¢  
Beach Pat., each \$3.00.....35¢ @ 5¢  
Empire.....25¢  
Blacksmiths'.....25¢  
Jacobs' Drill Chucks.....35¢  
Pratt's Positive Drive.....25¢  
Skinner Patent Chucks.....25¢  
Independent Lathe Chucks.....35¢  
Universal, Reversible Jaws.....35¢  
Combination, Reversible Jaws.....35¢  
Drill Chucks, New Model, 25;  
Standard, 45%; Skinner Pat.,  
25%; Positive Drive.....40¢  
Planer Chucks.....35¢  
Face Plate Jaws.....35¢  
Standard Tool Co.:  
Improved Drill Chuck.....45¢  
Union Mfg. Co.:  
Combination, Nos. 1, 2, 3, 4, 5, 6,  
7, 8 and 17, 40%; No. 21.....40¢  
Scroll Combination, Nos. 83 and  
25; Positive Drive.....40¢  
Gearing Scroll, Nos. 33, 34 and 35, 25¢  
Independent Iron, Nos. 18 and 316, 30¢  
Independent Steel, No. 64.....25¢  
Union Drill, Nos. 600, 90, 100, 101,  
102, 103, 104.....35¢  
Union Car Drill.....40¢  
Universal, 11, 12, 13, 14, 15, 40¢  
Universal, No. 42.....30¢  
Iron Face Plate Jaws, Nos. 28, 30,  
48 and 50.....40¢  
Steel Face Plate Jaws, Nos. 70 and  
72.....30¢  
Westcott Patent Chucks:  
Lathe Chuck.....50¢  
Little Giant Auxiliary Drill.....50¢  
Little Giant Double Grip Drill.....50¢  
Little Giant Drill, Improved.....50¢  
Onaida Drill.....50¢  
Scroll Combination Lathe.....50¢

**Clamps—**

Adjustable, Hammers.....20¢ @ 20¢ @ 5¢  
Carriage Makers, P. S. & W.....50¢ @ 10¢  
Posy, Parallel.....35¢ @ 10¢  
Myers' Hay Rack.....45¢  
Lineman's Swedish Neverturn.....65¢  
Wood Workers, Hammers.....40¢ @ 10¢  
Saw Clamps, see Vices, Saw Filers.

**Cleaners, Drain—**

Iwan's Champion, Adjustable.....50¢  
Iwan's Champion, Stationary.....40¢

**Sidewalk—**

Star Socket, All Steel, 3/4 doz. \$4.05 net  
Star Shank, All Steel, 3/4 doz. \$3.24 net  
W. & C. Shank, All Steel, 3/4 doz.,  
7 1/2 in., \$3.00; 8 in., \$3.25

**Cleavers, Butchers—**

Foster Bros.....30¢  
Fayette R. Plumb.....30¢  
L. & I. J. White Co.....30¢

**Clippers, Horse and Sheep—**

Chicago Flexible Shaft Company:  
1902 Chicago Horse, each, \$10.75  
20th Century Horse, each, \$5.00  
Lightning Belt Horse, each, \$15.00  
Chicago Belt Horse, each, \$20.00  
Stewart's Enclosed Gear  
Horse, each.....\$6.75  
Stewart's Patent Sheep Shear-  
ing Machine, each.....\$12.75  
Stewart Enclosed Gear Shear-  
ing Machine, No. 8, each, \$9.75

**Clips, Axle—**

Regular Styles, list July 1, '05,  
80¢ @ 9¢ @ 10¢

**Cloth and Netting, Wire**

—See Wire, &c.

**Cocks, Brass—**

Hardware list:  
Plain Bibbs, Globe, Kerosene,  
Racking, Liquor, Bottling,  
&c.....60¢ @ 10¢ @ 65¢  
Compression Bibbs.....55¢ @ 10¢ @ 60¢

**Coffee Mills—**

See Mills, Coffee.

**Collars, Dog—**

Nickel Chain, Walter B. Stevens &  
Sons list.....40¢  
Leather, Walter B. Stevens & Son's  
list.....40¢

**Combs, Curry—**

Metal Stamping Co.....40¢

**Compasses, Dividers, &c.**

Ordinary Goods.....70¢ @ 10¢ @ 75¢  
Wm. Schollhorn Co.:  
Excelsior Dividers.....60¢  
Lodi Dividers.....70¢ @ 10¢

**Conductor Pipe,—**

L. C. L. to Dealers:

Galv.	Charcoal	Copper.
Steel.	Iron.	1 1/2, 1 3/4, 2, 3, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100.
Eastern:	50¢ @ 7 1/2¢	30%
Central:	55¢ @ 2 1/2¢	20¢ @ 10%
Western and Southern:	55¢ @ 7 1/2¢	20¢ @ 7 1/2%
So. Western:	50¢ @ 2 1/2¢	20¢ @ 5%

Terms, 60 days; 2% cash 10 days. Fac-  
tory shipments generally delivered.  
See also Eave Troughs.

**Coolers, Water—**

R. M. Co.:  
Gal., ea. 2 3 4 6 8  
Yukon.....\$1.25 \$1.50 \$2.00 \$2.25 \$2.75  
Alaska.....\$2.25 \$2.50 \$3.00 \$4.00 \$5.00  
L. & G. Mfg. Co.:  
Gal.....2 3 4 6 8  
Galvanized, ea. \$1.85 \$2.00 \$2.25 \$2.50 \$3.00  
Galvanized, lined, side handles,  
Gal.....2 3 4 6 8  
Each.....\$1.95 \$2.15 \$2.40 \$3.30 \$4.15  
White Enamelled.....10¢  
Agate Lined.....10¢

**Coopers' Tools—**

See Tools, Coopers'.

**Coppers' Soldering—**

Soldering Coppers, 3 lbs. to pair  
and heavier, 32¢ @ 35¢; lighter  
than 3 lb. to pair.....34¢ @ 37¢

**Cord— Sash—**

Braded, Drab.....1/2 lb. 35¢  
Braded, White, Com., Nos. 8  
to 12, 26¢; No. 7, 26¢ @ 4¢; No. 6,  
27¢ @ 4¢.  
Cable Laid Italian, lb., No. 18.....37¢  
Italian, lb., A, No. 18, 25¢; B, 2¢  
Common India.....1/2 lb. 11¢ @ 11¢ @ 1¢  
Cotton Sash Cord, Twisted, 18¢ @ 20¢  
Patent Russia.....1/2 lb. 20¢  
Cable Laid Russia.....1/2 lb. 21¢  
India Hemp, Br'd'd.....1/2 lb. 21¢  
India Hemp, Twisted.....1/2 lb. 13¢ @ 14¢  
Patent India, Twisted.....1/2 lb. 17¢  
Pearl Braided, cotton, No. 6, 1/2 lb. 1/2  
Edgewise, No. 7, 26¢ @ 4¢; Nos. 8 to 12, 26¢  
Edgewise, Braided, Nos. 8 to 12,  
26¢; 7, 26¢ @ 4¢, 27¢ @ 4¢.  
Harmony Cable Laid Italian, Nos. 7  
to 10.....10¢  
Wire Sash Cord.....10¢  
Sash Cord Attachments, per doz. 10¢  
Sash Cord, Nos. 8 to 12.....10¢  
Braded, 1/2 lb., Drab Cotton,  
55¢; Italian Hemp, 40¢ @ 50¢  
50¢; Linen, 65¢; White Cot-  
ton, 50¢; Spot Cord.....50¢  
Massachusetts, White.....1/2 lb. 40¢  
Massachusetts, Drab.....1/2 lb. 45¢  
Phoenix, White, Nos. 8 to 12, 27¢  
Silver Lake, per lb.:  
A, Drab, 45¢; A, White, 40¢;  
B, Drab, 40¢; B, White, 35¢;  
Italian Hemp, 40¢; Linen.....37¢ @ 4¢  
See also Chain and Ribbon.

**Wire, Picture—**

List July 10, 1906, 85¢ @ 10¢ @ 85¢ @ 10¢  
Iendryx Standard Wire Picture Cord,  
old list, 85¢ @ 10¢  
Turner & Stanton Co. Wire Picture  
Cord.....85¢ @ 10¢

**Cradles—**

Grain.....40¢ @ 12 1/2%

**Crayons—**

White Round Crayons, Cases, 100  
gro., \$6.50 @ \$7.50 at factory, but  
lower prices made by jobbers  
Zelnicke's Lumber:  
White and Purple, Indelible.....\$7.50  
Blue, Red, Green, Yellow and  
Terra Cotta, \$6.50; Black.....\$4.00  
Giant Lumber, 5 1/2 in. x 13-16 in.,  
round, all colors, \$16.25; Indel-  
ible.....\$18.75  
Genuine Soapstone, Metal Workers',  
5 in. x 1/4 in. Round, \$2.50; 5 in. x  
1/4 in. Square, \$1.75; 5 in. x 1/2 x 3-16,  
\$2.50; 5 x 1 1/4 x 3-16.....\$3.00

**Crooks, Shepherds—**

Fort Madison, per doz., Heavy, \$5.50;  
Light.....\$5.00

**Crow Bars—See Bars, Crow.****Cultivators—**

Victor Garden.....50%

**Cutlery, Table—**

International Silver Company:  
No. 12 M'd'm Knives, 1847, 3/4 doz. \$3.50  
Star, Eagle, Rogers & Hamilton  
and Anchor.....3/4 doz. \$3.00  
Wm. Rogers & Son.....3/4 doz. \$2.50

**Cutters— Glass—**

I. H. Mayhew Co.....40¢  
Red Devil.....60¢  
R. Mfg. Co.....40¢  
Woodward.....50%

**Meat and Food—**

American.....30¢  
Nos. 401 402 403 404 405 406 407  
Each.....\$3 \$7 \$10 \$12 \$25 \$50 \$60  
Enterprise:  
Nos. 5 10 12 22 32  
Each.....\$2 \$3 \$2.75 \$4.50 \$6 \$25 @ 25¢ @ 7 1/2¢  
No. 202, \$1.50.....10¢ @ 7 1/2¢  
P. S. & W. Co.:  
Dixon's.....3/4 doz. 33 1/2¢  
Nos. 1 2 3 4  
Ideal.....\$14.00 \$17.00 \$19.00 \$30.00  
Hales.....\$10.00 \$14.00 \$16.00 \$20.00  
Little Giant.....3/4 doz. 40¢ @ 50¢  
Nos. 305 310 312 320 322  
\$35.00 \$48.00 \$44.00 \$72.00 \$68.00  
New Triumph No. 635, 3/4 doz. \$24.00;  
10¢ @ 10¢  
Hussein Food, No. 1, \$24.00; No. 2,  
\$27.00.....45¢ @ 10¢ @ 10¢  
Enterprise Beef Shavers.....25¢ @ 10¢

**Slaw and Kraut—**

Henry Huston & Sons:  
Slaw and Kraut Cutters.....35¢  
Corn Graters.....30¢  
J. M. Mast Mfg. Co.:  
Slaw Cutters, 1 Knife.....3/4 doz. \$3.00  
Combined Slaw Cutter and Corn  
Grater.....3/4 doz. \$4.00  
Tucker & Dorsey Mfg. Co.:  
Kraut Cutters.....35¢ @ 5¢  
Slaw Cutters, 1 Knife.....1/4 gr. \$18¢ @ 24¢  
Slaw Cutters, 2 Knife.....1/4 gr. \$24¢ @ 30¢

**Tobacco—**

All Iron, Cheap, doz. \$4.25 @ \$1.50  
Enterprise.....25¢ @ 10¢  
National, 3/4 doz., No. 1, \$21; No. 2,  
\$18.....10¢

**Diggers, Post Hole, &c.—**

Disston's:  
Rapid, 3/4 doz., \$21.00.....25¢  
Samson, 3/4 doz., \$34.00.....25¢  
Iwan's Improved Post Hole Auger.....1/2 doz., \$7.00  
Vaughan Pattern Post Hole Augers,  
Perfection Post Hole Diggers, 3/4  
doz.....\$8.75  
Split Handle Post Hole Diggers,  
Hercules Pattern, 3/4 doz.....\$10.00  
Kohler's, 3/4 doz., Universal, \$15.00;  
Little Giant, \$12.00; Hercules,  
\$10.00; Invincible, \$9.00; Rival  
\$8.50; Pioneer, \$7.50  
Never Break Post Hole Diggers, 3/4  
doz., \$24.00.....60¢

**Dividers—See Compasses.****Drawers, Money—**

Tucker's Pat. Alarm Tills, 3/4 doz.,  
\$15.00 @ \$24.00

**Drawing Knives—**

See Knives, Drawing.

**Dressers, Emery Wheel—**

Sterling Emery Wheel Dressers.....35¢  
Sterling Wheel Dresser Cutters.....35¢

**Drills and Drill Stocks—**

Blacksmiths' Common Drilling  
Machines.....\$1.50 @ \$1.75  
Brest, Millers Falls.....40¢ @ 10¢  
Brest, P. S. & W.....33¢  
Goodell Automatic Drills, 50¢ @ 10¢ @ 10¢  
Millers Falls Automatic Drills, 33¢ @ 10¢  
Ratchet, Curtis & Curtis.....40¢  
Ratchet, Parker.....40¢  
Ratchet, Weston's, Style H Im-  
proved.....40¢  
Ratchet, No. 012.....40¢  
Ratchet, Celebrated.....40¢  
Ratchet, Whitney's, P. S. & W.....40¢  
Whitney's Hand Drill, No. 1, \$10.00;  
Adjustable, No. 10, \$12.00.....33¢

**Twist Drills—**

Bit Stock.....60¢ @ 10¢ @ 70¢  
Taper and Straight Shank.....60¢ @ 10¢ @ 60¢ @ 10¢ @ 5¢

**Drivers, Screw—**

Screw Driver Bits, per doz. 45¢ @ 50¢  
Balsey's Screw Driver and Driver, 3/4  
doz., 2 1/2 in., \$6; 4 in., \$7.50; 6 in.,  
\$9  
Buck Bros.' Screw Driver Bits.....50¢  
Champion.....50¢  
Disston's.....60¢  
Edson.....70¢  
Fray's Hol. H'die Sets, No. 3, \$12.50  
Ford's Brace Screw Drivers.....40¢ @ 10¢  
Gay's Double Action Ratchet.....35¢  
Goodell's Auto.....55¢ @ 65¢ @ 40¢  
Mayhew's Black Handle.....40¢  
Mayhew's Monarch.....40¢  
Millers Falls, Nos. 20 and 21.....25¢ @ 10¢  
Millers Falls, Nos. 11, 12, 41, 42, 15¢ @ 10¢  
New England Specialty Co.....30¢  
Smith & Hemenway Co. Never-  
turn, 66%; Elmora, 63%; Star,  
30¢ @ 10¢  
H. D. Smith & Co.'s Perfect H'die, 40¢  
Swan's  
Nos. 7565 to 7568, 50%; No. 7540,  
40¢ @ 10¢

**Eave Trough, Galvanized—**

Territory. L. C. L. Galvanized  
Galv. Charcoal Copper.  
Steel. Iron. 1 1/2, 1 3/4, 2, 3, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100.

Eastern:  
70¢ @ 30% 70% 30%

Central:  
75¢ @ 10¢ @ 2 1/2% 65¢ @ 10% 20¢ @ 10%

Western and Southern:  
75¢ @ 7 1/2% 65% 20¢ @ 7 1/2%

So. Western:  
75% 60¢ @ 10% 20¢ @ 5%

Terms—2% for cash. Factory ship-  
ments generally delivered.  
See also Conductor Pipe and Elbows

**Elbows and Shoes—**

Factory ship ments, all territories:  
Galv. Steel and Galv. C. I.  
Standard Gauge.....80%  
No. 26.....65¢ @ 5¢  
No. 21.....85¢  
No. 22.....10¢  
Copper.....40¢ @ 10%

**Elbows, Stove Pipe—**

Edwards, Standard Blue.....40¢ @ 10¢ @ 10¢  
Edwards, Royal Blue.....40¢ @ 10¢ @ 10¢  
Reeves, Dover, one piece.....40¢ @ 10¢  
Republic, Perfect Elbows.....50%

**Extractors, Lemon Juice**—See *Squeezers, Lemon*.**Fasteners, Blind—**Zimmerman's ..... 50¢ 10¢  
Walling's ..... 40¢ 10¢  
Upson's Patent ..... 40¢**Cord and Weight—**

Ives and Titan ..... 33¢ 1/2

**Faucets—**Cork Lined ..... 50¢ 10¢ 60¢  
Metallic Key, Leather Lined ..... 60¢ 10¢ 70¢Red Cedar ..... 40¢ 10¢ 50¢  
Petroleum ..... 70¢ 10¢ 75¢L. & L. B. Co.:  
Metal Key ..... 60¢ 10¢  
Star ..... 60¢ 10¢West Lock ..... 50¢ 10¢  
John Sommer's Peerless Tin Key ..... 40¢John Sommer's Boss Tin Key ..... 50¢  
John Sommer's Victor Mtl. Key ..... 50¢ 10¢John Sommer's Duplex Metal Key ..... 60¢  
John Sommer's Diamond Lock ..... 40¢John Sommer's I. X. L. Cork Lined ..... 50¢  
John Sommer's Reliable Cork Lined ..... 50¢ 10¢John Sommer's Chicago Cork Lined ..... 60¢  
John Sommer's O. K. Cork Lined ..... 60¢John Sommer's No. Brand, Cedar ..... 40¢  
John Sommer's Perfection, Cedar ..... 40¢McKenna, Brass:  
Burglar Proof, Liquor, 1/2 doz. \$8.25  
Improved, 3/4, \$7.50; 1, \$8.25Self Measuring:  
Enterprise, 1/2 doz. \$36.00 ..... 40¢ 10¢  
Lane's, 3/4 doz. \$36.00 ..... 40¢ 10¢

National Measuring, 1/2 doz. \$36.00 ..... 40¢ 10¢

Felloe Plates—  
See Plates, Felloe.**Files—Domestic—**

List Nov. 1, 1899.

Best Brands ..... 70¢ 10¢ 75¢ 10¢  
Standard Brands ..... 75¢ 10¢ 75¢ 10¢ 80¢  
Lower Grade ..... 75¢ 10¢ 10¢ 80¢ 10¢**Imported—**Stubs' Tapers, Stubs' list, July  
24, '97 ..... 33 1/3-40¢**Fixtures, Fire Door—**Allith Underwriters' Approved ..... 50¢  
Richards Mfg. Co.:  
Universal, No. 103; Special, No.  
104 ..... 43.75Fusible Links, No. 90 ..... 50¢  
Expansion Bolts, No. 107 ..... 60¢ 10¢**Grindstone—**Net Prices:  
1/2 in. .... 15 17 19 21  
Per doz. .... \$3.60 3.85 4.15 4.65P. S. & W. Co. .... 25¢  
Leading Hardware Co. .... 60¢  
Stowell's Giant Grindstone ..... 60¢Stowell's Grindstone Fixtures, Extra  
Heavy, 40¢ 10¢; Light ..... 50¢**Fodder Squeezers—**

See Compressors.

**Forks—**NOTE.—Manufacturers are  
selling from the list of September  
1, 1904, but many jobbers are still  
using list of August 1, 1899, or  
selling at net prices.Iowa Dig-Ezy Potato ..... 60¢ 10¢  
Victor, Hay ..... 60¢ 15¢ 2 1/2Victor, Manure ..... 60¢ 15¢ 2 1/2  
Victor, Header ..... 60¢ 15¢ 2 1/2Champion, Hay ..... 60¢ 15¢ 2 1/2  
Champion, Header ..... 60¢ 15¢ 2 1/2Champion, Manure ..... 60¢ 15¢ 2 1/2  
Columbia, Hay ..... 60¢ 15¢ 2 1/2Columbia, Manure ..... 60¢ 15¢ 2 1/2  
Columbia, Spading ..... 70¢ 12¢ 1/2Hawkeye Wood Barley ..... 40¢  
W. & C. Potato Digger ..... 30¢ 10¢Acme Hay ..... 60¢ 10¢ 5¢  
Acme Manure, 4 tie ..... 60¢ 10¢ 5¢Dakota Header ..... 60¢ 10¢ 5¢  
Jackson Steel Barley ..... 60¢ 10¢ 5¢Kansas Header ..... 60¢ 10¢ 5¢  
W. & C. Favorite Wood Barley ..... 40¢

Plated—See Spoons.

**Frames—Wood Saw—**White, S'g't Bar, per doz. 75¢ 80¢  
Red, S'g't Bar, per doz. 1.00¢ 1.25

Red, Dbl. Brace, per doz. 1.40¢ 1.50

**Freezers, Ice Cream—**Qt. .... 1 2 3 4 6  
Each ..... \$1.30 \$1.60 \$1.90 \$2.20 \$2.80**Fruit and Jelly Presses—**

See Presses, Fruit and Jelly.

**Fry Pans—See Pans, Fry.****Fuse—Per 1000 Feet.**Hemp ..... \$2.75  
Cotton ..... 3.20Waterproof Sgl. Taped ..... 3.65  
Waterproof Dbl. Taped ..... 4.40

Waterproof Tpl. Taped ..... 5.15

**Gates, Molasses and Oil—**

Stebbins' Pattern ..... 75¢ 80¢

**Gauges—**Marking, Mortise, &c. 50¢ 50¢ 10¢  
Chapin-Stephens Co.:  
Marking, Mortise, &c. 50¢ 50¢ 10¢Diston's Marking, Mortise, &c. 67 1/2¢  
Wire, Brown & Sharpe's ..... 33 1/2¢Wire, Morse's ..... 25¢  
Wire, P. S. & W. Co. .... 33 1/2¢**Gimlets—Single Cut—**

Numbered assortments, per gro.

Nail, Metal, No. 1, \$2.00; 2, \$2.30  
Spike, Metal, No. 1, \$4.00; 2, \$1.30Nail, Wood Handled, No. 1, \$2.00  
Spike, Wood Handled, No. 1, \$1.50Spike, Wood Handled, No. 1, \$1.50  
Spike, Wood Handled, No. 1, \$1.50**Glass, American Window**

See Trade Report.

**Glasses, Level—**

Chapin-Stephens Co. .... 65¢ 65¢ 10¢

**Glue, Liquid Fish—**Bottles or Cans, with Brush ..... 25¢ 10¢ 50¢  
Elwell's ..... 40¢**Grease, Axle—**Common Grade ..... gro. \$6.00 6.50  
Dixon's Everlasting, 10-lb pails, ea.  
85¢; in boxes, 1/2 doz., 1 lb. \$1.20;  
2 lb. \$2.00

Holmet Hard Oil ..... 25¢

**Griddles, Soapstone—**

Pike Mfg. Co. .... 33¢ 33¢ 10¢

**Grinders—**Royal Mfg. Co.:  
Alundum Grinding Machines, each.  
Nos. 01, \$1.75; 1A, \$2.50; 10,  
\$5.00Alundum Sickle Grinders, each.  
Nos. 20, \$5.00; 20A, \$6.00; 20A  
Combined, \$6.30Alundum Disc Grinders, each.  
\$2.50**Grindstones—**Pike Mfg. Co.:  
Improved Family Grindstones, 1/2  
in. 1/2 doz., \$2.00 ..... 33¢Richards Mfg. Co., Eli and Cycle,  
Ball Bearing, mounted ..... 40¢**Grips, Nipple—**

Perfect Nipple Grips ..... 40¢ 10¢ 2¢

**Halters and Ties—**

Cow Ties ..... 60¢ 45¢ 60¢ 10¢

Covort Mfg. Co.:  
Web ..... 30¢ 2¢  
Jute Rope ..... 35¢Sisal Rope ..... 20¢  
Cotton Rope ..... 40¢Hemp Rope ..... 40¢  
Onedra Community ..... 40¢ 40¢ 5¢Am. Coil and Halters ..... 45¢ 50¢ 5¢  
Niagara Coil and Halters ..... 45¢ 50¢ 5¢

Niagara Cow Ties ..... 45¢ 50¢ 5¢ 10¢ 5¢

**Hammers—**Handled Hammers—  
Heller's Machinists' ..... 55¢ 100¢ 5¢ 10¢ 5¢Heller's Farmers' ..... 40¢ 50¢ 40¢ 10¢ 5¢  
Peck, Stow & Wilcox Co.:  
Crucible Steel ..... 50¢Farmers' ..... 40¢ 10¢ 5¢  
Riveting ..... 50¢Machinists', revised list ..... 60¢ 5¢  
Blacksmiths' ..... 50¢ 5¢Fayette R. Plumb:  
A. E. Nail ..... 40¢ 2 1/2 40¢ 12 1/2Eng. and B. S. Hand ..... 50¢ 60¢ 5¢  
Machinists' Hammers ..... 60¢ 60¢ 10¢Rivet and Timbers ..... 40¢ 40¢ 12 1/2 5¢  
Vaughan & Bushnell Mfg. Co. ..... 40¢ 2 1/2 40¢ 12 1/2

Machinists' ..... 50¢ 15¢ 60¢ 5¢

**Heavy Hammers and Sledges—**

Under 3 lb., per lb., 50¢ 90¢ 5¢ ..... 80¢ 10¢ 5¢

3 to 5 lb., per lb., 40¢ 80¢ 45¢ ..... 80¢ 10¢ 5¢

Over 5 lb., per lb., 30¢ ..... 80¢ 10¢ 5¢

Wilkinson's Smith's ..... lb. 9¢ 10¢

**Handles—**Agricultural Tool Handles  
See List, &c. .... 60¢ 10¢ 60¢ 10¢ 5¢

Hoe, Rake, &amp;c. .... 40¢ 45¢ 5¢

Fork, Shovel, Spade, &c.:  
Long Handles ..... 40¢ 45¢ 5¢

D Handles ..... 40¢

**Cross-Cut Saw Handles—**

Akins ..... 40¢

Champion ..... 50¢

Diston's ..... 50¢

Mechanics' Tool Handles—  
Auger, assorted ..... gro. \$2.50 3.00 3.50

Brad Axl. .... gro. \$1.65 1.75

Chisel Handles, Ass'd, per gro.:  
Tanged Firmer, Apple, \$2.40  
\$2.65; Hickory, \$2.15 to \$2.40Socket Firming, Apple, \$1.75  
\$1.95; Hickory, \$1.45 to \$1.60

Socket Framing, Hickory, \$1.60 to \$1.75

File, assorted ..... gro. \$1.30 1.40

Hammer, Hatchet, &amp;c. .... 60¢ 10¢ 60¢ 10¢ 5¢

Hand Saw, Varished, doz.  
80¢ 85¢; Not Varished ..... 65¢ 75¢Plane Handles:  
Jack, doz. 50¢; Jack, Bolted, 75¢  
Fore, doz. 45¢; Fore, Bolted, 90¢Chapin-Stephens Co.:  
Carving Tool ..... 40¢ 40¢ 10¢

Chisel ..... 50¢ 55¢ 10¢

File and Plane ..... 60¢ 65¢ 10¢

Saw and Plane ..... 40¢ 40¢ 10¢

Screw Driver ..... 40¢ 40¢ 10¢

Mullers Falls Adj. and Ratchet Auger  
Handles ..... 15¢ 10¢

Nicholson Simplicity File Handle ..... 10¢ 85¢ 1.50

W. A. Zelnicker Supply Co.:  
Hammer, 1/2 doz., 12 in., \$2.00;  
14 in., \$2.00; 16 in., \$2.30; 18  
in., \$2.50; 20 in., \$2.70; 22 in.  
\$3.00; 24 in., \$3.30; 26 in., \$3.50;  
30 in., \$3.80Sledge, 1/2 doz., oval, 39 in.,  
\$3.80; octagon, 30 in., \$3.80;  
oval, 36 in., \$4.00; octagon,  
36 in., \$4.00Axe, 1/2 doz., 28 to 34 in., \$5.60;  
36 in., \$5.80Adze, 1/2 doz., 36 in., \$5.80; 36  
in., \$7.80Pick, 1/2 doz., R. R., 36 in.,  
\$8.00; coal, 34 in., \$5.80Hatchet, 1/2 doz., 12 to 14 in.,  
\$2.00**Hangers—**NOTE.—Barn Door Hangers are gen-  
erally quoted per pair, without track,  
and Parlor Door Hangers per double set  
with track, &c.Allith Mfg. Co.:  
Reliable, Nos. 1 and 2; Allith, No.  
3; Allith Adjustable, No. 6; Re-  
liable Parlor Door ..... 50¢**Chicago Spring Butt Co.:—**Friction ..... 75¢  
Oscillating ..... 25¢Big Twin ..... 50¢  
Chisholm & Moore Mfg. Co.:  
Baggage Car Door ..... 50¢Elevator ..... 30¢  
Railroad ..... 50¢Cronk & Carrier Mfg. Co.:  
Loose Axle ..... 60¢ 2 1/2

Roller Bearing ..... 70¢ 2 1/2

Griffin Mfg. Co.:  
Solid Axle, No. 10, \$12.00, 60¢ 10¢Roller Bearing, No. 11, \$15.00,  
60¢ 10¢

Roller Bearing, Ex. Hly ..... 70¢

22, \$18.00, 60¢ 10¢  
Bull Dog, \$24.00, 70¢Lane Bros. Co.:  
Parlor, Ball Bearing, \$1.00;  
Standard, \$3.15; No. 105, \$2.85;  
New Model, \$2.80; New Cham-  
pion, \$2.25

Barn Door, Standard ..... 60¢ 10¢

Hinged ..... net \$6.00

Covered ..... 60¢ 5¢

Special ..... 70¢ 5¢

Lawrence Bros.:  
Advance ..... 55¢ 10¢

Cleveland ..... 70¢ 7 1/2

Clippert, No. 75 ..... 55¢ 10¢

Crown ..... 55¢ 10¢

Cyclone, No. 40 ..... net \$6.50

Tandem, No. 50 ..... net \$7.50

New York ..... 55¢ 10¢

McKinney Mfg. Co.:  
Roller Bearing, Nos. 1 and 2, 70¢  
Anti-Friction ..... 60¢Hinged Hangers, King Charn. 60¢  
Meyers Stagon Hangers ..... 60¢Richards Mfg. Co.:  
Hangers, Nos. 47, 48, 117, 217,  
60¢ 5¢Pioneer Wood Track, No. 3, \$2.25  
Roller B'g St'l Track No. 12, \$2.20Roller B'g St'l Track No. 13, \$2.50  
Roller B'g, Nos. 39, 41, 43,  
45, 47, 49, 51, 53, 55, 57, 59, 61,  
63, 65, 67, 69, 71, 73, 75, 77, 79,  
81, 83, 85, 87, 89, 91, 93, 95, 97,  
99, 101, 103, 105, 107, 109, 111,  
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617, 619, 621, 623, 625, 627, 629,  
631, 633, 635, 637, 639, 641, 643,  
645, 647, 649, 651, 653, 655, 657,  
659, 661, 663, 665, 667, 669, 671,  
673, 675, 677, 679, 681, 683, 685,  
687, 689, 691, 693, 695, 697, 699,  
701, 703, 705, 707, 709, 711, 713,  
715, 717, 719, 721, 723, 725, 727,  
729, 731, 733, 735, 737, 739, 741,  
743, 745, 747, 749, 751, 753, 755,  
757, 759, 761, 763, 765, 767, 769,  
771, 773, 775, 777, 779, 781, 783,  
785, 787, 789, 791, 793, 795, 797,  
799, 801, 803, 805, 807, 809, 811,  
813, 815, 817, 819, 821, 823, 825,  
827, 829, 831, 833, 835, 837, 839,  
841, 843, 845, 847, 849, 851, 853,  
855, 857, 859, 861, 863, 865, 867,  
869, 871, 873, 875, 877, 879, 881,  
883, 885, 887, 889, 891, 893, 895,  
897, 899, 901, 903, 905, 907, 909,  
911, 913, 915, 917, 919, 921, 923,  
925, 927, 929, 931, 933, 935, 937,  
939, 941, 943, 945, 947, 949, 951,  
953, 955, 957, 959, 961, 963, 965,  
967, 969, 971, 973, 975, 977, 979,  
981, 983, 985, 987, 989, 991, 993,  
995, 997, 999, 1001, 1003, 1005,  
1007, 1009, 1011, 1013, 1015, 1017,  
1019, 1021, 1023, 1025, 1027, 1029,  
1031, 1033, 1035, 1037, 1039, 1041,  
1043, 1045, 1047, 1049, 1051, 1053,  
1055, 1057, 1059, 1061, 1063, 1065,  
1067, 1069, 1071, 107



**Hoes— Eye—**  
**Scovill and Oval Pattern**.....  
 60¢ 10¢ 60¢ 10¢ 10¢  
**Grub, list Feb. 23, 1899**.....  
 70¢ 10¢ 75¢ 10¢  
 D. & H. Scovill.....  
 Am. Fork & Hoe Co. (Scovill Pat-  
 tern).....

**Handled—**  
**NOTE—Manufacturers are selling**  
**from the list of September 1, 1904, but**  
**many jobbers are still using list of Au-**  
**gust 1, 1899, or selling at net prices.**  
 Cronk's Weeding, No. 1, \$2.00; No. 2, \$2.50  
 Star Double Bit.....  
 Ft. Madison Cotton Hoe.....  
 Ft. Madison Crescent Cultivator Hoe.....  
 17" Madison Mattock Hoe.....  
 Regular Weight.....  
 Junior Size.....  
 Ft. Madison Sprouting Hoe.....  
 Ft. Madison Dixie Tobacco Hoe.....  
 Kretzinger's Cut Easy.....  
 Warren Hoe.....  
 W. & C. Ivahoe.....  
 B. H. 6 in. Cultivator Hoe.....  
 B. H. 6 in. Cultivator Hoe.....  
 Acme Weeding.....  
 W. & C. Lining Shovel Hoe.....

**Hoisting Apparatus—**  
 See **Machines, Hoisting.**  
**Holders— Bit—**  
 Angular, ½ doz.....  
**Door—**  
 Bardale's, Iron, 40%; Brass and  
 Bronze.....  
 Empire.....  
 Pullman.....  
 Richards Mfg. Co., No. 115, Sure  
 ready, 40%; No. 119, Sure  
 Grip.....  
 Superior.....  
**File and Tool—**  
 Nicholson File Holders and File  
 Handles.....  
**Fruit Jar—**  
 Triumph Fruit Jar Holder, ½ gross,  
 \$10.80; ½ doz.....  
**Trace and Rein—**  
 Fernald Double Trace Holder, ½ doz.  
 pairs.....  
 Dash Rein Holder, ½ doz. pairs.....  
**Hones—Razor—**  
 Pike Mfg. Co., Belgian and Swat,  
 50%; German.....  
**Hooks—Cast Iron—**  
 Bird Cage, Reading.....  
 Clothes Line, Reading List.....  
 Clothes Line, Stowell's.....  
 Coat and Hat, Reading.....  
 Coat and Hat, Stowell's.....  
 Coat and Hat, Wrightville.....  
 Harness, Reading List.....  
 Harness, Stowell's.....  
 School House, Stowell's.....  
**Wire—**  
 Belt.....  
 Wire C. & H. Hooks.....  
 Bradley Metal Clasp Wire, Coat and  
 Hat.....  
 Columbian Hdw. Co., Gem.....  
 Parker Wire Goods Co., King.....  
 Western W. G. Co. Molding.....  
 Wire Goods Co., Chief, 70%; Crown,  
 75%; Czar, 85%; Brace, 75%;  
 Czar Harness, 50¢ 10¢  
**Wrought Iron—**  
 Box, 6 in., per doz., \$1.00; 8 in.,  
 \$1.25; 10 in., \$2.50.  
 Cotton.....  
 Wrought Staples, Hooks, &c.....  
**Miscellaneous—**  
 Hooks, Bench, see **Stops, Bench.**  
 Rush, Light, doz., \$6.20; Medium,  
 \$6.75; Heavy, \$7.65  
 Grass, best, all sizes, per doz., \$3.00  
 Grass, common grades, all sizes,  
 per doz.....  
 Whiffletree.....  
**Hooks and Eyes:**  
 Brass.....  
 Malleable Iron.....  
 Coves, Mfg. Co. Gate and Scuttle  
 Hooks.....  
 Ft. Madison Cut-Easy Corn Hooks,  
 ½ doz. \$3.25 net  
 Turner & Stanton Co., Cup and  
 Shoulder.....  
 Bench Hooks—See **Bench Stops.**  
 Corn Hooks—See **Knives, Corn.**  
**Horse Nails—**  
 See **Nails, Horse.**  
**Horseshoes—**  
 See **Shoes, Horses.**  
**Hose, Rubber—**  
 Garden Hose, ¾-inch:  
 Competition.....  
 3-ply Guaranteed.....  
 4-ply Guaranteed.....  
 Cotton Garden, ¾-in., coupled:  
 Low Grade.....  
 Fair Quality.....  
**Irons— Sad—**  
 From 1 to 10.....  
 B. B. Sad Irons.....  
 Mrs. Potts', cents per set:  
 Nos. 50 55 60 65  
 Jap'd Tops.....  
 Tin'd Tops.....  
 New England Pressing.....  
**Bar and Corner—**  
 Richards Mfg. Co., Bar, 60¢ 10¢;  
 Corner.....  
**Pinking—**  
 Pinking Irons.....  
**Irons, Soldering**  
 See **Conners.**  
**Jacks, Wagon—**  
 Covert Mfg. Co.:  
 Auto Screw.....  
 Lockport.....

Lane's Steel.....  
 Richards, Tiger Steel, No. 140.....  
 Smith & Hemenway Co.'s.....  
**Ladder—**  
 Richards Mfg. Co., Ladder Jacks.....

**Kettles—**  
 Brass, Spun, Plain.....  
 Enamelled and Cast Iron—See **Ware.**  
**Knives—**  
**Butcher, Kitchen, &c.—**  
 Foster Bros., Butcher &c.....  
 Wilkinson Shear & Cutlery Co.....  
**Corn—**  
 Wilkinson Shear & Cutlery Co.  
 Wilcut Brand Knives and Hooks.....  
 Withington Acme.....  
 Deut, \$2.15; Adj. Serrated, \$2.20;  
 Serrated, \$2.10; Yankee No. 1, \$1.50;  
 Yankee No. 2, \$1.15.  
**Drawing—**  
 Standard List.....  
 C. E. Jennings & Co., Nos. 45, 46,  
 25¢ 7¢  
 Jennings & Griffin, Nos. 41, 42,  
 66¢ 7¢  
 Swan's.....  
 Watrous.....  
 L. & J. White.....  
**Hay and Straw—**  
 Serrated Edge, per doz., \$5.50 @ 5.75  
 Iwan's Sickle Edge.....  
 Iwan's Serrated.....  
**Mincing—**  
 Buffalo.....  
**Miscellaneous—**  
 Farriers'.....  
 Wostenholm's.....  
**Knobs—**  
 Base, 2½-inch, Birch, or Maple,  
 Rubber Tip.....  
 Carriage, Jap., all sizes.....  
**Door, Mineral—**  
 Door, Por. Jap'd.....  
 Door, Por. Nickel.....  
 Bardley's Wood Door, Shutters, &c.....

**Lacing, Leather—**  
 See **Belting, Leather—**  
**Ladders, Store, &c.—**  
 Allith Mfg. Co., Reliable.....  
 Lane's Store.....  
 Myers' Noiseless Store Ladders.....  
 Richards Mfg. Co.:  
 Improved Noiseless, No. 112.....  
 Climax Shelf, No. 113.....  
 Trolley, No. 109.....  
**Ladles, Melting—**  
 L. & G. Mfg. Co. (low list).....  
 P. S. & W.....  
**Lanterns—Tubular—**  
 Regular, No. 0.....  
 Side Lift, No. 0.....  
 Hinge Globe, No. 0.....  
 Other Styles.....  
**Bull's Eye Police—**  
 3-inch.....  
**Lasts and Stands, Shoe—**  
 Stowell's Atlas, Malleable Iron.....  
 Stowell's Badger, Cast Iron.....  
**Latches—Thumb—**  
 Roggin's Latches, with screw.....  
**Door—**  
 Allith Mfg. Co., Reliable and Alleg-  
 ator, 50%; Reliable Cold Storage, 50%  
 Cronk & Carrier Mfg. Co., No. 101,  
 ½ doz., \$2.30  
 Richards' Bull Dog, Heavy, No.  
 125.....  
 Richards' Trump, No. 127.....  
 Stowell's Steel.....  
**Leaders, Cattle—**  
 Small.....  
 Covert Mfg. Co.:  
 Cotton, 45%; Hemp, 45%; Jute, 35%;  
 Sisal, 20%.  
**Leathers, Pump—**  
 See **Pumps—**  
**Lifters, Transom—**  
 R. & E.....  
**Lines—**  
 Wire Clothes, Nos. 18 19 20  
 100 feet.....  
 75 feet.....  
 Samson Cordage Works:  
 Solid Braided Chalk, Nos. 0 to 3, 40%  
 Solid Braided Makers'.....  
 Silver Lake Braided Chalk, No. 0,  
 \$6.00; No. 1, \$6.50; No. 2, \$7.00; No.  
 3, \$7.50.  
 Mason's Lines, Shade Cord, &c.:  
 White Cotton, No. 3½, \$1.50; No. 4,  
 \$2.00; No. 4½, \$2.50; Colors, No. 3½,  
 \$1.75; No. 4, \$2.25; No. 4½, \$2.75;  
 Linen, No. 3½, \$2.50; No. 4, \$3.50;  
 No. 4½, \$4.50.  
 Tent and Awning Lines: No. 5  
 White Cotton, \$7.50; Drab Cotton,  
 \$8.50.  
 Clothes Lines, White Cotton: 50 ft.,  
 \$2.75; 60 ft., \$3.25; 70 ft., \$3.75; 75  
 ft., \$4.00; 80 ft., \$4.25; 90 ft., \$4.75;  
 100 ft., \$5.25.  
 Turner & Stanton Co.:  
 Solid Braided Chalk, Masons' and  
 Awning Lines.....  
 Clothes Lines White Cotton.....  
 Shade Cord, Cotton or Linen.....  
**Locks— Cabinet—**  
 Cabinet Locks.....  
**Door Locks, Latches, &c—**  
**NOTE—Net prices are very often made**  
**on these goods.**  
 Reading Hardware Co.....  
 R. & E. Mfg. Co.....  
 Stowell's.....  
**Elevator—**  
 Padlocks.....  
 R. & E. Mfg. Co. Wrought Steel and  
 Brass.....  
**Sash, &c.—**  
 Iron Patent.....  
 Bronze and Brass, 55¢ 5%; Crescent,  
 60%; Iron, 60%; Window Ventil-  
 ating, 40¢ 20%; Robinson Pat. Ven-  
 tilating Sash Lock, 33%.

Pullman Patent Ventilating Lock.....  
 Reading.....  
**Machines—Boring—**  
 Com. Up'r, without Augers.....  
 \$2.00 @ 2.25  
 Com. Ang'r, without Augers.....  
 \$2.25 @ 2.50  
 Swan's Improved.....  
 Jennings, Nos. 1 and 4.....  
 Nutters' Patents.....  
 Snell's, Upright, \$2.65; Angular, \$2.90  
**Corking—**  
 Reisinger Invinible Hand Power.....  
**Fence—**  
 Williams' Fence Machines.....  
**Hoisting—**  
 Moore's Anti-Friction Chain Hoist.....  
 Moore's Hand Hoist, with Lock  
 Brake.....  
 Moore's Cyclon, High Speed Chain  
 Hoist.....  
**Ice Cutting—**  
 Chandler's Washing.....  
 Ross Washboard Machine Co.: Per doz.  
 Ross No. 1.....  
 Ross Rotary.....  
 Champion Rotary Banner No. 1.....  
 Standard Champion No. 1.....  
 Standard Perfection.....  
 Cincinnati Square Western.....  
 Uneda American, Round.....  
**Mallets—**  
 Hickory.....  
 Lignumvitae.....  
 Tinnars' Hickory and Apple-  
 wood.....  
**Mangers, Stable—**  
 Swett Iron Works.....  
**Mashers, Vegetable—**  
 Western, W. G. Co., Potato.....  
**Mats, Door—**  
 Elastic Steel (W. G. Co.), new list.....  
 Keystone Wire Matting Co.:  
 Ideal.....  
**Mattocks—**  
 See **Picks and Mattocks.**  
**Milk Cans—See Cans, Milk.**  
**Mills, Coffee, &c.—**  
 Enterprise Mfg. Co.....  
 National list Jan. 1, 1907.....  
 Parker's Columbia and Victoria.....  
 Parker's Box and Side.....  
 Swift, Lane Bros. Co.....  
**Motors Water—**  
 Divine's Red Devil.....  
**Mowers, Lawn—**  
**NOTE—Net prices are generally quoted**  
**Cheapest—**  
 all sizes, \$1.00 @ 2.50  
 Cheap.....  
 all sizes, \$2.00 @ 2.50  
 Better Grade.....  
 all sizes, \$2.50 @ 4.50  
 12 14 16 18 in.  
 High Grade.....  
 Continental.....  
 Great American.....  
 Great American Ball B'g, new list.....  
 Quaker City.....  
 Pennsylvania.....  
 Pennsylvania, Jr., Ball Bearing.....  
 Pennsylvania Golf.....  
 Pennsylvania Horse.....  
 Pennsylvania Pony.....  
 Granite State:  
 Style A, Low Wheel.....  
 Style B, Low Wheel.....  
 Style C, High Wheel, spl. disc.....  
 Style D, High Wheel, spl. disc.....  
 Philadelphia:  
 Styles M, S. O. K. T.....  
 Style A, all Steel.....  
 Style B, High Wheel.....  
 Drexel and Gold Coin, special list.....  
 Horse.....  
 Pony.....  
 36-in. Horse.....  
 Eagle Horse.....  
 I. X. L. Horse.....  
**Nails—**  
 Wire Nails and Brads, Miscel-  
 laneous.....  
 Cut and Wire. See **Trade Report.**  
 Hungarian, Finishing, Upholster-  
 ers' &c. See **Tacks.**  
**Horse—**  
 Nos. 5 7 8 9 10  
 Anchor.....  
 Champlain.....  
 Coleman.....  
 New Haven.....  
 Livingston.....  
 Western.....  
 Jobbers' Special Brands.....  
**Picture—**  
 1½ 2 2½ 3 in.  
 Brass H'd.....  
 Por. Head.....  
**Nippers—**  
 See **Pliers and Nippers.**  
**Nuts—**  
 Cold Punched: Off list.  
 Square, Blank or Tapped.....  
 Hexagon, Blank or Tapped.....  
 Square, B'l'k, C. T. & R.....  
 Hexagon, B'l'k, C. T. & R.....  
 Hot Pressed:  
 Square, Blank.....  
 Hexagon, Blank.....  
 Square, Tapped.....  
 Hexagon, Tapped.....  
**Oakum—**  
 Rest.....  
 U. S. Navy.....  
 Navy.....  
 Plumbers' Spun Oakum.....  
 In carload lots ½¢ lb. off, f.o.b.  
 New York.

**Oil Tanks—See Tanks, Oil.**  
**Oilers—**  
 Brass and Copper.....  
 Tin or Steel.....  
 Zinc.....  
 Chase or Paragon:  
 Brass and Copper.....  
 Tin or Steel.....  
 Zinc.....  
 Malleable, Hammers' Improved, Nos.  
 1, 2, 3, 50%  
 American Tube & Stamping Co.:  
 Spring Bottom Cans.....  
 Railroad Oilers, &c.....  
**Openers—Can—Per doz.**  
 Sprague, Iron Handle.....  
 Sprague, Wood Handle.....  
 Sardinia Scissors.....  
 Vim Tin Shear and Can Opener,  
 ½ doz, 75¢; per gro., \$7.50  
 Yankee Can and Bottle Opener,  
 \$1.75; Little Gem, ½ doz., net.....  
**Ess—**  
 Nickel Plate, ½ doz., \$2.00; Silver  
 Plate, \$4.00.  
**Packing—**  
 Asbestos Packing, Wick and  
 Rope.....  
**Rubber—**  
 (Fair quality goods.)  
 Sheet, C. I.....  
 Sheet, C. O. S.....  
 Sheet, C. B. S.....  
 Sheet, Pure Gum.....  
 Sheet, Red.....  
 Jenkins' '96, ½ lb. 80¢  
**Miscellaneous—**  
 American Packing.....  
 Cotton Packing.....  
 Italian Packing.....  
 Jute.....  
 Russia Packing.....  
**Pails, Creamery—**  
 R. M. Co., with gauges, ½ doz.,  
 No. 20, \$3.75; No. 120, \$8.40.  
**Pails, Water, Well, &c.—**  
 See **Buckets.**  
**Pans—Dripping—**  
 Standard List.....  
 Edwards, Royal Blue.....  
**Fry—**  
 Nos. 1 2 3 4 5  
 Per doz. \$0.75 0.80 0.90 1.10 1.30  
**Refrigerator, Galva.—**  
 Inch.....  
 Per doz.....  
**Roasting and Baking—**  
 R. M. Co.:  
 Regal, ½ doz., Nos. 5, \$3.75; 10,  
 \$4.75; 20, \$5.75; 30, \$6.00.  
 Savory, ½ doz., net, Nos. 220,  
 \$8.15; 400, \$10.00; 22½, \$11.00;  
 \$16.80.  
 Simplex, ½ doz.:  
 No.....  
 \$2.50 3.00 3.50 2.75 3.35 4.00  
**Paper—Building Paper**  
 Asbestos.....  
 Roll Board or Building Felt,  
 6 to 30 lb., per 100 sq. ft. \$3.50 to 5  
 Roll Board or Building Felt,  
 3-32 and ¼ in., 45 to 60 lb.,  
 per 100 sq. ft.....  
 Mill Board, Sheet, 40 x 40 in.,  
 1-32 to ¼ in.....  
**Per roll**  
 Roe'n Sized Sheathing: 500 sq. ft.  
 Light weight, 25 lbs. to roll.....  
 40¢ 50¢  
 Medium weight, 30 lbs. to roll.....  
 50¢ 55¢  
 Heavy weight, 40 lbs. to roll.....  
 65¢ 70¢  
 Black Water Proof Sheathing,  
 500 sq. ft., 1 ply, 65¢; 2 ply,  
 85¢; 3 ply, \$1.10; 4 ply, \$1.25.  
 Deafening Felt, 9, 6 and 4½ sq.  
 ft. to lb. ton.....  
 Red Rope Roofing, 250 sq. ft.  
 per roll.....  
**Tarred Paper—**  
 1 ply (roll 500 sq. ft.), ton.....  
 2 ply, roll 100 sq. ft.....  
 3 ply, roll 100 sq. ft.....  
 Slater's Felt (roll 500 sq. ft.), 75¢  
**Sand and Emery—**  
 Flint Paper and Cloth.....  
 Garnet Paper and Cloth.....  
 Emery Paper and Cloth.....  
**Parers—Apple—**  
 Goodell Co.:  
 Family Bay State.....  
 Improved Bay State.....  
 New Lightning.....  
 Turn Table.....  
 White Mountain.....  
 Bonanza Improved.....  
 Dandy.....  
 Eureka Improved.....  
 New Century.....  
 Ranger.....  
 Livingston Nail Co.:  
 Daisy.....  
 Little Star.....  
 Rocking Table.....  
 Reading Hardware Co.:  
 Advance.....  
 Baldwin.....  
 Reading 72.....  
 Reading 78.....  
**Potato—**  
 Saratoga.....  
 White Mountain.....  
**Picks and Mattocks—**  
 List, Feb. 23, 1899.....  
 Cronk's Handled Garden Mattock,  
 ½ doz., No. 2, \$2.60; No. 3, \$6.40.  
**Pinking Irons—**  
 See **Irons, Pinking.**



**Pincers—**

Vaughan & Bushnell Mfg. Co.:  
Blacksmiths, per doz. 10 in.,  
\$5.00; 12 in., \$5.50; 14 in., \$6.00.  
Carpenters' Claw, per doz. 6 in.,  
\$2.00; 8 in., \$2.75; 10 in., \$3.50.

**Pins, Escutcheon—**

Brass ..... 50¢ @ 50¢ & 10%  
Iron, list Nov. 11, '05 ..... 60¢ @ 60¢ & 10%

**Pipe, Cast Iron Soil—**

Standard, 2-6 in. .... 50%  
Extra Heavy, 2-6 in. .... 60%  
Fittings, Stand. and H'ey. .... 70%

**Pipe, Merchant—**

Consumers, Carloads.		Steel.		Iron.	
Blk. Galv.	Blk. Galv.	Blk. Galv.	Blk. Galv.	Blk. Galv.	Blk. Galv.
1/2 & 1/4 in. .... 64	48	57	41		
3/4 in. .... 66	52	59	41		
1/2 in. .... 68	54	61	49		
3/4 in. .... 72	56	66	56		
7 to 12 in. .... 69	84	61	46		

**Pipe, Vitrified Sewer—**

Carload lots.  
Standard Pipe and Fittings, 3  
to 24 in., f.o.b. factory:  
First-class ..... 82%  
Second-class ..... 85%

NOTE.—Market irregular.

**Pipe, Stove—**

Per 100 tons.		C. L. C. L.	
Edwards' Nested:			
5 in., Standard Blue.....	\$6.25	\$7.25	
6 in., Standard Blue.....	6.75	7.75	
7 in., Standard Blue.....	7.75	8.75	
5 in., Royal Blue.....	7.00	8.00	
6 in., Royal Blue.....	7.50	8.50	
7 in., Royal Blue.....	8.50	9.50	
Wheeler Corrugating Co.'s Nested:			
5 in., Uniform Color.....	\$6.15	\$7.15	
6 in., Uniform Color.....	6.65	7.65	
7 in., Uniform Color.....	7.65	8.65	

**Planes and Plane Irons—****Wood Planes—**

<b>Wood Planes—</b>	
Bench, first qual. ....	30@30&10%
Bench, second qual. ....	40@40&10%
Molding . . . . .	25@25&10%
(Chapin-Stephens Co.:	
Bench, First Quality.....	30%
Bench, Second Quality.....	40%
Molding and Miscellaneous.....	25%
Toy and German.....	30%
Union.....	60%

**Iron Planes—**

Chaplin's Iron Planes..... 50¢ & 10%  
Union..... 60%

**Plane Irons—**

Wood Bench Plane Irons, list Dec. 12, '06.....	25%
Buck Bros.....	30%
Chapin-Stephens Co.....	25%
Union.....	25%
L. & J. White.....	20¢ @ 25¢ & 20%

**Planters, Corn, Hand—**

Kohler's Eclipse..... per doz. \$8.00

**Plates—**

Felco ..... 1 lb. 4¢ @ 4¢ & 10%  
Self-Sealing Pl. Plates (R. M.  
Co.) ..... per doz. \$2.00..... 50%

**Pliers and Nippers—**

Button Pliers.....	75¢ @ 75¢ & 10%
Gas Burner, per doz. 5 in., \$1.25 @ \$1.50; 6 in., \$1.45 @ \$1.50.	
Gas Pipe.....	7 8 10 12-in. \$2.00 \$2.25 \$2.75 \$3.50
Acme Nippers.....	50¢ & 5%
Cronk & Carrier Mfg. Co.: American Button.....	80%
Improved Button.....	75¢ & 10%
Cronk's No. 80 Linemen's.....	50%
Stub's Pattern.....	45%
Combination and others.....	33%
Heller's Farriers' Nippers, Pincers and Tools.....	40¢ & 5¢ @ 40¢ & 10%
The Nettleton Mfg. Co. Reversible Cutting Nippers.....	40%
P. S. & W. Timmers' Cutting Nip- pers.....	40%
Wm. Schollhorn Co.: Bernard, 35%; Elm City, 35%; Paragon, 50%; Lodi, 55%.	
Swedish Side, End and Diagonal Cut- ting Pliers.....	50%
Utica Drop Forge and Tool Co.: Pliers and Nippers, all kinds.....	40%
Vaughan & Bushnell Mfg. Co.: Gas Burner, per doz. 5 in., \$2.50; 6 in., \$3.00. Gas, per doz. 7 in., \$3.50; 8 in., \$3.75; 10 in., \$4.50.	
Nippers, Horseshoers' Cutting, 40%; Hoof Paring.....	40%

**Plumbs and Levels—**

Chapin-Stephens Co.: Plumbs and Levels.....	30¢ @ 30¢ & 10%
Chapin's Imp. Brass Cor. ....	40¢ @ 40¢ & 10%
Pocket Levels.....	30¢ @ 30¢ & 10%
Extension Sights.....	30¢ @ 30¢ & 10%
Machinists' Levels.....	40¢ @ 40¢ & 10%
Diston's Plumbs and Levels.....	60¢ & 10%
Diston's Pocket Levels.....	60¢ & 10%
Stanley's Duplex.....	35%
Woods' Extension.....	33%

**Poachers, Egg—**

Buffalo Steam Egg Poachers, per doz.  
Nos. 00, \$1.75; 0, \$6.00; 1, \$5.50;  
2, \$8.00; 600, \$13.80..... 40%

**Points, Glaziers—**

Bulk and 1-lb. papers..... 1 lb. 10¢  
1/4-lb. papers..... 70¢ @ 10¢ & 10%  
1/2-lb. papers..... 70¢ @ 10¢ & 10%

**Police Goods—**

Manufacturers' Lists..... 25¢ @ 25¢ & 10%  
Tower's..... 25%

**Polish—Metal, Etc—**

Glashire, No. 2, 5 lb. can (powder),  
each, \$1.25; per doz. \$12.00; No. 2, 10 lb.  
can (cake), each, \$2.50; per doz. \$24.00.

Prestoline Liquid, No. 1 (1/2 pt.),  
doz., \$3.00; No. 2 (1 qt.), \$9.00..... 40%  
Prestoline Paste.....  
George William Hoffman:  
U. S. Metal Polish Paste, 3 oz.  
boxes, per doz. 50¢; per gro. \$4.50;  
1/2 lb. boxes, per doz. \$1.25; 1 lb.  
boxes, per doz. \$2.25.  
U. S. Liquid, 8 oz. cans, per doz.,  
\$1.25.  
Barkeepers' Friend Metal Polish, per  
doz., \$1.75.

**Stove—**

Black Eagle Benzine Paste, 5 lb. cans,  
per doz. 10¢  
Black Eagle, Liquid, 1/2 pt. cans,  
per doz. 75¢  
Black Jack Paste, 1/2 lb. cans, per gr. \$9.00  
Black Kid Paste, 5 lb. cans, each, \$0.65  
Ladd's Black Beauty Liquid, per  
100 tins..... \$0.75  
Joseph Dixon's, per gr. \$1.75..... 10%  
Dixon's Plumbago..... per gr. \$2.50  
Fireside..... per gr. \$2.50  
Gem, per gr. \$1.50..... 10%  
Japanese..... per gr. \$3.50  
Jet Black..... per gr. \$3.50  
Peerless Iron Enamel, 10 oz. cans,  
per doz. \$1.50

**Peppers, Corn—**

1 qt. Square, doz. \$0.88; gro. \$8.75  
1 qt. Round, doz. \$1.00; gro. \$10.00  
1/2 qt. Square, doz. \$1.10; gro. \$11.00  
2 qt. Square, doz. \$1.35; gro. \$13.50

**Post Hole and Tree Au-  
gers and Diggers—**

See also Diggers, Post Hole, &c.

**Posts, Steel—**

Steel Fence Post, each, 5 ft., 42¢;  
6 ft., 46¢; 6 1/2 ft., 48¢.  
Steel Hitching Posts..... each \$1.30

**Potato Parers—**

See Parers, Potato.

**Pots, Glue—**

Enamelled ..... 35¢ @ 10%  
Tinned ..... 30¢ @ 10%

**Powder—**

In Canisters: Duck, 1 lb. ....	each 45¢
Fine Sporting, 1 lb. ....	each 75¢
Rifle, 1/2 lb. ....	each 15¢
Rifle, 1 lb. ....	each 25¢
In Kegs: 12 1/4-lb. kegs.....	\$3.50
25-lb. kegs.....	\$4.50
King's Semi-Smokeless: Keg (25 lb. bulk).....	\$6.50
Half Keg (12 1/2 lb. bulk).....	\$3.50
Quarter Keg (6 1/4 lb. bulk).....	\$1.90
Case 24 (1 lb. cans bulk).....	\$6.50
Half case (1 lb. cans bulk).....	\$3.50
King's Smokeless: Shot Gun, Rifle, Keg (25 lb. bulk).....	\$12.00 \$15.00
Half Keg (12 1/2 lb. bulk).....	6.25 7.75
Quarter Keg (6 1/4 lb. bulk).....	3.25 4.00
Case 24 (1 lb. cans bulk).....	14.00 17.00
Half case 12 (1 lb. c. bk.).....	7.25 8.75
Robin Hood Smokeless Shot Gun.....	50¢ @ 20%

**Presses—****Fruit and Jelly**

Enterprise Mfg. Co..... 20¢ @ 25%

**Seal Presses—**

Morrill's No. 1, per doz., \$20.00..... 50%

**Pruning Hooks and Shears**

See Shears.

**Pullers, Nail—**

Cyclops..... 50%  
Miller's Falls, No. 3, per doz., 32¢ @ 10%  
Morrill's No. 1, Nail Puller, per doz.,  
\$20.00..... 50%  
Pearson No. 1, Cyclone Spike Puller,  
each \$30.00..... 50%  
The Scranton Co. Case Lots:  
No. 2B (large)..... \$5.50  
No. 3B (small)..... \$5.00  
Smith & Hemenway Co.:  
Diamond B..... 70%  
Giant..... 50%  
Staple Pullers, Utica and Davi-  
son..... 50%  
Parrot Tack and Stub Puller, per doz.,  
75¢; per gro. \$6.00

**Pulleys, Single Wheel—**

Inch	1 1/2	1 1/2	2	3
Avening or Tackle,				
doz.	\$0.30	.45	.60	1.05
Hay Fork, Strivel or Solid Eye,				
doz., 4 in.	\$1.25	1.50	1.75	2.25
Inch	1 1/2	1 1/2	2	3
Hot House, doz.	\$0.65	.85	1.00	1.25
Inch	1 1/2	1 1/2	1 1/2	1 1/2
Screw, doz.	\$0.16	.19	.23	.30
Inch	1 1/2	1 1/2	1 1/2	1 1/2
Side, doz.	\$0.25	.40	.55	.80
Inch	1 1/2	1 1/2	2	3
Stowell's:				
Ceiling or End, Anti-Friction.	60¢ & 10%			
Dumb Waiter, Anti-Friction.	60¢ & 10%			
Electric Light.	60%			
Side, Anti-Friction.	60¢ & 10%			

**Sash Pulleys—**

Common Frame; Square or  
Round End, per doz. 1 1/4 and  
2 in. .... 17¢ @ 20¢  
Auger Mortise, no Face Plate  
per doz. 1 1/4 and 2 in. .... 20¢ @ 21¢  
Acme, No. 35, 1 1/4 in., 19¢; 2 in., 20¢  
For All-Steel, Nos. 3 and 1, 2 in., 20¢  
Grand Rapids All Steel Noiseless..... 50%  
Ideal ..... 70¢ & 5%  
Niagara, No. 25, 1 1/4 in., 19¢; 2  
in. .... 20¢ @ 21¢  
Star, No. 26, 1 1/4 in., 19¢; 2 in., 20¢  
Tackle Blocks—See Blocks.

**Pumps—**

Cistern ..... 60%  
Pitcher Spout..... 75¢ @ 75¢ & 10%  
Wood Pumps, Tubing, &c. .... 50%  
Barnes Dbl. Acting (low list)..... 40¢ & 5%  
Barnes Pitcher Spout..... 75¢ & 5%  
Contractors' Rubber Diaphragm No. 2,  
B. & L. Block Co..... \$16.00  
Daisy Spray Pump..... per doz. \$5.50

Flint & Walling's Fast Mail Hand,  
(low list)..... 50%  
Flint & Walling's Fast Mail (low  
list)..... 50%  
Flint & Walling's Tight Top Pitcher..... 75¢ & 10%

National Specialty Mfg. Co., Measur-  
ing, Nos. 2, \$6.00; 3, \$5.50..... 30%  
Myers' Pumps (low list)..... 45%  
Myers' Power Pumps..... 45%  
Myers' Spray Pumps..... 45%

**Pump Leathers—**

Plunger and Lower Valve—Per  
gro. ....

Inch.	2	2 1/2	3	3 1/2
.....	\$2.20	2.50	2.75	3.00
Inch. ....	3 1/2	3 1/2	3 1/2	3 1/2
.....	\$3.30	3.60	3.85	4.10

Plunger Cup Leathers—Per 100:

Inch.	2 1/2	3	3 1/2	4
.....	\$2.75	3.85	5.00	6.00

**Punches—**

Saddlers' or Drive, good..... doz. 50¢ @ 75¢

Spring, single tube, good qual-  
ity..... \$1.75 @ 2.00

Revolving (4 tubes)..... doz. \$3.50 @ 3.75

Bemis & Call Co.'s Cast St'l Drive..... 50%

Morrill's Nos. 1AA, 1A, 1B, 1C,  
1D, \$15.00..... 50%

Hercules, 1 die, each \$5.00..... 50%

Niagara Hollow Punches..... 40%

Niagara Solid Punches..... 55¢ @ 10%

Wm. Schollhorn Co.:  
Belt and Ticket, Bernard, 35%;  
Paragon, 50%; Lodi, 55%..... 55%

Timmers' Hollow, P. S. & W. Co. 40%  
Timmers' Solid, P. S. & W. Co. 40%  
doz., \$1.44..... 40%

**Rail—Barn Door, &c.—**

Sliding Door, Painted Iron..... 2 1/2 @ 2 3/4

Sliding Door, Wrought Brass,  
1 1/2 in., lb., 36¢..... 30%

Allith Mfg. Co.: Reliable Hanger  
Track ..... 50%

Cronk's:  
Double Braced Steel Rail, per ft. 3 1/4¢  
O. N. T. Rail..... \$3.12

Griffin's:  
xxx, per 100 ft., 1 x 3-16 in., \$3.25;  
1 1/4 x 3-16 in., \$3.75;  
Hinged Hanger, per 100 ft., 1 x 3-16  
in., \$3.50; 1 1/4 x 3-16 in., \$4.00.

Lane's:  
Hinged Track, per 100 ft. .... \$3.45  
O. N. T., per 100 ft., 1 in., \$3.00; 1 1/4  
in., \$3.45; 1 1/2 in., \$4.00.

Standard, 1 1/4 in. .... per 100 ft. \$4.00

Lawrence Bros.:  
1 x 3-16 in., per 100 ft., \$7.50; 1 1/4 x  
3-16 in., \$8.75..... 55¢ & 7 1/2%

McKinney's:  
Hinged Hanger Track, per ft., 11¢  
1 x 3-16 Track..... 55¢ & 7 1/2%

Myers' Stays, Track..... 60¢ & 5%

Richards, Mfg. Co.:  
Common, 1 x 3-16 in., \$3.00; 1 1/4 x  
3-16, \$3.25; 1 1/2 x 3-16, \$3.50.  
Special Hinged Hanger Rail..... 60¢ & 10%

Lag Screw Rail, No. 63..... 50%

Gauge Trolley Track, per ft., No. 31,  
No. 32, 14¢; No. 33, 20¢..... 60¢ & 10%

No. 61, \$3.00; 62, \$3.25; 63, \$3.50; 64,  
\$4.00; 45, \$3.25; 46, \$3.50; 49, No. 1,  
\$3.25; 49, No. 2, \$3.50.

Stowell's:  
Cast Rail..... per ft. 2 1/4¢

Steel Rail, Plain..... 25%

Wrought Bracket, 1 x 3-16 in.,  
per ft. 3.13¢

Wrought Bracket, 1 1/4 x 5-16, per ft. 1¢

Sweet's Hinge Hanger..... 60¢ & 5%

P. L. B. Steel Rail..... per 100 ft. \$3.12

No. 0, 1 x 3-16..... per 100 ft. \$3.12

**Rakes—**

NOTE.—Many goods are sold  
at net prices.

Fort Madison Red Head Lawn..... \$3.25

Fort Madison Blue Head Lawn..... \$2.70

Cronk's:  
Steel Garden: Champion, 75%;  
Victor..... 80¢ & 25%

Queen City Lawn, per doz., 29 te. .... \$2.85; 24, \$3.00..... 10¢

Anticlog Lawn, per doz..... \$1.00

Malleable Garden..... 70¢ & 10%

Ideal Steel Garden, per doz., 12 teeth,  
\$15.00; 14, \$16.00; 16, \$18.00..... 80%

Kohler's:  
Lawn Queen, 20-tooth..... per doz. \$3.15

Lawn Queen, 24-tooth..... per doz. \$3.25

Paragon, 20-tooth..... per doz. \$2.70

Paragon, 24-tooth..... per doz. \$2.75

Steel Garden, 14-tooth..... per doz. \$2.40

Malleable Garden, 14-tooth, per doz.,  
\$2.00 @ 25%

**Rasps, Horse—**

Diston's..... 75%

Heller Bros..... 70¢ & 5¢ @ 70¢ & 10%

Liveright Bros' Gold Medal..... 70¢ & 10%

McCaffrey's American Standard..... 60¢ & 10%

New Nicholson..... 70¢ & 10%

See also Files.

**Razors—**

Liana Bo-ras-ic..... 60%

For Razors, per doz., No. 42, \$20.00;  
No. 44, \$20.00; No. 42, Platina, }  
\$25.00

Red Devil..... 65%

Silberstein..... 60¢ & 10%

Carbo Magnetic, \$2

**Saws—**

Atkins' Circular	45%
Hand	50@50.10
Butcher Saws	50
Cross Cuts	35%
One-Man Cross Cut	40%
Narrow Cross Cut	50%
Hand, Rip and Panel	35.45
Miter Box and Compass	45%
Mulay, Mill and Drag	10.10
Wood Saws	10.10
Chapin-Stephens Co.	
Turning Saws and Frames	30.40@10%
Diamond Saw & Stamping Works	
Sterling Kitchen Saws	30.10@10%
Disston's:	
Circular, Solid and Ins'ted Tooth	50%
Band, 2 to 18 in. wide	60%
Hand, 1/4 to 1 1/2	60%
Crosscuts	45%
Narrow Crosscuts	50%
Mulay, Mill and Drag	25%
Framed Wood Saws	25%
Wood Saw Blades	25%
Wood Saw Rods, Tinned	15%
Hand Saws, Nos. 12, 99, 9, 16, d100	25%
D8, 120, 76, 17, 8	25%
Hand Saws, Nos. 7, 107, 107 1/2, 3, 1	25%
0, 00, Combination	25%
Compass, Key Hole	35%
Butcher Saws and Blades	30%
C. E. Jennings & Co.'s:	
Back Saws	16%
Butcher Saws	25.47 1/2
Compass and Key Hole Saws	33.47 1/2
Framed Wood Saws	23.47 1/2
Hand Saws	12 1/2
Wood Saw Blades	33.47 1/2
Millers Falls:	
Butcher Saws	15.10
Star Saw Blades	15.10
Massachusetts Saw Works:	
Victor Kitchen Saws	40.10@50%
Butcher Saws and Blades	35.40
Peace & Richardson's Hand Saws	30%
Simonds:	
Circular Saws	45%
Crecent Ground Cross Cut Saws	30%
One-Man Cross Cuts	40.10
Gang Mill, Mulay and Drag Saws	45%
Hand Saws	25.47 1/2
Back Saws	25.47 1/2
Butcher Saws	35.47 1/2
Hand Saws	35.47 1/2
Hand Saws, Bay State Brand	45%
Compass, Key Hole, &c.	25.47 1/2
Wood Saws	40.47 1/2
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws	50%

**Hack Saw Blades and Frames—**

Atkins' Hack Saw Blades A A A	25%
Disston's:	
Concave Blades	25%
Keystone Blades	35%
Hack S. Frames	30%
Simonds	35%
C. E. Jennings & Co.'s	
Hack Saw Frames, Nos. 175, 180	40.47 1/2
Hack Saws, Nos. 175, 180, complete	40.47 1/2
Goodell's Hack Saw Blades	40.10
Griffin's Hack Saw Frames	35.47 1/2
Griffin's Hack Saw Blades	35.47 1/2
Star Hack Saws and Blades	15.10
Sterling Hack Saw Blades	30.10@45%
Sterling Hack Saw Frames	30.10@10%
Sterling Power Hack Saw Machines	
each, No. 1, \$25.00; No. 2, \$30.00	
Victor Hack Saw Blades	20%
Victor Hack Saw Frames	40%

**Scroll—**

Barnes, No. 7, \$15	25%
Barnes' Scroll Saw Blades	25%
Barnes' Velocipede Power Scroll Saw	
without boring attachment	\$18
with boring attachment	\$20
Lester, complete	\$10.00
Rogers, complete	\$3.50 and \$4.00

**Scales—**

Family, Turnbull's	50@50.10%
Counter:	
Hatch, Platform, 1/2 oz. to 4 lbs.	doz. \$5.50
Two Platforms, 1/2 oz. to 8 lbs.	doz. \$10.00
Union Platform, Plain \$1.70@1.90	
Union Platform, Stpd. \$1.85@2.15	
Chattillon's:	
Eureka	25%
Favorite	40%
Crocker's Trip Scales	50%
Chicago Scale Co.'s:	
The Little Detective	25 lbs 50
Union or Family No. 2	50%
Portable Platform (reduced list)	50%
Wagon or Stock (reduced list)	25.45
The Standard Portables	40%
The Standard R. R. and Warehouse	50.10%

**Scrapers—**

Box, 1 Handle	doz. \$2.00@2.25
Box, 2 Handle	doz. \$3.50@2.00
Ship	Light, \$2.00; Heavy, \$1.50
Chapin-Stephens Co. Box	30.23@10%
Richards Mfg. Co., Foot	60%

**Screws—Bench and Hand**

Bench, Iron, doz., 1 in.	\$2.50@2.75
2 1/2; 1 1/2, \$3.00@3.25; 1 1/4, \$3.50@3.75	
Bench, Wood	20.20@10%
Hand, Wood	20.20@10%
R. Bliss Mfg. Co., Hand	20.45@20.10%
Chapin-Stephens Co., Hand	20%
Coach, Lag and Hand Rail—	
Lag, Cone Point, list Oct. 1	75.15%
Coach, Gimlet Point, list Oct. 1	75.10%
Hand Rail, list Jan. 1, '81	70.10@75%

**Jack Screws—**

Standard List	70.10@75%
Millers Falls	50.40@10%
Sweet Iron Works	70.75%

**Machine—**

List Jan. 1, '98:	
Flat or Round Head, Iron, Brass or Bronze	50@50.10%

**Fillister Head, Iron, Brass or Bronze**

Set and Cap—	
Set (Iron)	75.10@71 1/2%
Set (Steel), net advance over Iron	25%
Sq. Hd. Cap	70.10@71 1/2%
Hex. Hd. Cap	70.10@71 1/2%
Rd. Hd. Cap	50.47 1/2%
Fillister Hd. Cap	60.47 1/2%

**Wood**

List July 23, 1907:	
Flat Head, Iron	87.45@
Round Head, Iron	85.45@
Flat Head, Brass	80.45@
Round Head, Brass	77.45@
Flat Head, Bronze	75.45@
Round Head, Bronze	72.45@
Drive Screws	87.45@

**Scroll Saws—**

See Saws, Scroll.

**Scythes—**

Per doz.	
Grass, No. 1, Plain	\$6.25@6.75
Clipper, Bronzed Webb	\$6.50@7.00
No. 3 Clipper, Pol'd Webb	\$6.75@7.25
No. 6 Clipper and Solid Steel	\$7.00@7.50
Bush, Weed and Bramble, No. 2	\$6.50@7.00
Grain, No. 1	\$8.25@8.75
Bronzed Webb, No. 1	\$8.50@9.00
Nos. 3 and 4 Clipper, Grain	\$8.75@9.25
Solid Steel, No. 6	\$9.25@9.75

**Seeders, Raisin—**

Enterprise 25.30%

**Sets—Awl and Tool**

Fray's Adj. Tool Handles, No. 1, \$12;	
2, \$18; 3, \$12; 4, \$2; 5, \$7	
Millers Falls Adj. Tool Handles, No. 1, \$12; No. 4, \$12; No. 5, \$18	20.10%
Garden Tool Sets—	
Ft. Madison Three Plows, Hoe, Rake and Shovel	40 doz sets \$9.00

**Sets, Nail—**

Octagon	gro. \$3.50@3.75
Buck Bros	27.4%
Cannon's Diamond Point	40.10%
Mayhew's	40.10%
Snell's Corrugated, Cup Pt.	40.10%
Snell's Knurled, Cup Pt.	40.10%
Victor Knurled Cup Pt.	40.10%

**Rivet—**

Regular list. 75.47 1/2@10%

**Saw—**

Atkin's:	
Criterion	40%
Adjustable	40%
Disston's Star, Monarch and Tri-	
umph	30%
Morrill's No. 1	\$15.00
Nos. 3 and 4, Cross Cut	\$20.60
No. 5, Mill	\$30.00
Nos. 10, 11, 95	\$15.60
No. 1 Old Style	\$10.00
Special	\$16.25
Giant Royal Cross Cut	40 doz. \$4.00
Royal, Hand	40 doz. \$4.50
Taintor Positive	40 doz. \$4.75

**Shaving—**

Fox Shaving Sets, No. 30

40 doz, net, \$24.00

Smith &amp; Hemenway Co.'s 75%

**Sharpeners, Knife—**

Chicago Wheel & Mfg. Co.	70%
Pike Mfg. Co.:	
Fast Cut Pocket Knife Hones	40%
40 doz.	\$1.50
Mounted Kitchen Sand Stone	40%
40 doz.	\$1.50
Natural Grit Carving Knife	40%
Hones, 40 doz.	\$3.00
Quick Cut Emery Carving	40%
Knife Hones, 40 doz.	\$1.50
Quick Edge Pocket Knife	40%
Hones, 40 doz.	\$2.50

**Skate—**

Smith &amp; Hemenway Co., Eureka. 50%

**Shaves, Spoke—**

Iron	doz. \$1.10@1.25
Wood	doz. \$1.75@2.25
Bailey's (Stanley R. & L. Co.)	45%
Chapin-Stephens Co.	30.30@10%
Goodell's	40 doz. \$9.00
Wood's F1 and F2	50%

**Shears—**

Cast Iron	7 8 9 in.
Best	\$16.00 18.00 20.00 gro.
Good	\$13.00 15.00 17.00 gro.
Chop	\$5.00 6.00 7.00 gro.
Straight Trimmers, &c.:	
Best quality, Jap.	70.40@10%
Best quality, Nickel	60.40@10%
Fair quality, Jap.	60.40@10%
Fair quality, Nickel	75.40@10%
Tailors' Shears	40.40@10%
Acme Cast Shears	40.40@10%
Heinrich's Tailor's Shears	10%
Wilkinson Shear & Cutlery Co.	
Sheep, 1900 list	30.10@5%
Grass	50.40%
Horse or Mule	50.40%

**Tinners' Snips—**

Steel Blades	20.45@20.10%
Steel Laid Blades	40.10@50%
Forged Handles, Steel Blades, Berlin	
Heinrich's Snips	40%
Jennings & Griffin Mfg. Co.'s 6 1/2 to 10 in.	33.47 1/2%
Niagara Snips	40%
P. S. & W. Forged Handles	25%
W. R. W.	40.10%

**Pruning Shears—**

Cronk's Hand Shears	33.4%
Cronk's Wood Handle Shears	33.4%
Disston's Combined Pruning Hook and Saw	40 doz. \$18.00
Disston's Pruning Hook only	40 doz. \$12.00
John T. Henry Mfg. Co.	
Pruning Shears, all grades	40%
P. S. & W. Co. & Cutlery Co.	40.10%
Wilkinson Shear & Cutlery Co.	60.10%
Hedge, Wilcut Brand	60.10%

**Lawn and Border, Wilcut Brand.**

60.10%

**Sheaves—Sliding Door—**

Stowell's Anti-Friction 50%

Reading 40%

R. &amp; E. list 15%

**Sliding Shutter—**

Reading list 40%

R. &amp; E. list 10%

**Shells—Shells, Empty—**

Brass Shells, Empty:

Climax, 10 and 12 gauge 65.10%

Club, Rival, 65.45%; First Quality 60.45%

Paper Shells, Empty:

New Rapid, 10, 12, 16 and 20 gauge 25.10%

Climax, 10 and 12 gauge; Acme, 10, 12, 16 and 20 gauge; Ideal, 10, 12, 16 and 20 gauge; Leader grade, 25.45%

Union, League, 12 and 12 gauge 25.45%

Rival Grade 25.45%

New Climax, Defiance, 10, 12, 14, 16 and 20 gauge; Climax, 10, 12, 16 and 20 gauge 20.45%

Challenge, Monarch, 10, 12, 16 and 20 gauge; League, Union, 14, 16 and 20 gauge; Repeater Grade 20.45%

Expert, 10, 12, 16 and 20 gauge 33.45%

Robin Hood, Low Brass 20.45%

Robin Hood, High Brass 30.45%

Indian, for Black Powder 25.45%

**Shells, Loaded—**

Loaded with Black Powder 40%

Loaded with Smokeless Powder, medium grade 40.45%

Loaded with Smokeless Powder, high grade 40.45%

Robin Hood:

Smokeless Robin Hood, Low Brass 40.10%

Smokeless Comets, High Brass 40.10%

Indian, Black Powder 40.45%

Union Metallic Cartridge Co.: 40%

New Club, Black Powder 40.45%

Nitro Club, Smokeless Powder 40.45%

Arrow, Smokeless Powder 40.10%

Winchester:

Smokeless Repeater Grade 40.45%

Smokeless Leader Grade 40.10%

Black Powder 40.45%

**Shingles, Metal—Per Sq.**

Edwards Mfg. Co.:

Painted. Galv.

14 x 20 \$1.25 \$6.25

10 x 14 4.50 6.25

7 x 10 4.75 6.50

Wheeling Corrugating Co.:

Dixie, 14 x 20 in. \$4.25 \$5.50

Dixie, 10 x 14 in. 4.50 6.00

Dixie, 7 x 10 in. 5.00 6.75

**Shoes, Horse, Mule, &c.—**

F.o.b. Pittsburgh:

Iron per keg \$4.10

Steel per keg \$3.85

Burden's, all sizes per keg \$3.90

**Shot—**

25-lb. bag.

Drop, up to B. \$1.95

Drop, B. and larger 2.20

Buck 2.20

Chilled 2.20

Dust 2.40

**Shovels and Spades—**

Association List, Nov. 15, 1902 40%

Avery Stamping Co. 40%

**Snow Shovels—**

Long Handle \$3.25@3.50

Wood and Mail, D. Handle \$3.75@4.00

**Sieves and Sifters—**

Hunter's Imitation

gro. \$9.50@10.00

Hunter's Genuine

per gro. \$12.00@12.50

Buffalo Metallic Blued, R. M. Co. 40 gr.

1176 1820

1176 \$15.00 \$18.00

**Sieves, Seamless Metallic**

Per dozen.

Mesh 14 16 18 20

Iron Wire \$1.05 1.05 1.10 1.20

Tinned Wire \$1.15 1.15 1.20 1.30

**Sieves, Wooden Rim—**

Nested, 10, 11 and 12 in.

Mesh 18, Nested doz. \$0.90@0.95

Mesh 20, Nested doz. \$1.00@1.05

Mesh 24, Nested doz. \$1.30@1.40

**Sinks, Cast Iron—**

Painted, Standard list:

12 x 12 to 22 x 36 in. 60%

20 x 40 to 24 x 50 in. 50%

24 x 60 to 24 x 120 in. 30%

Barnes' low list:

Up to and including 20 x 36 in. 50%

20 x 40 to 24 x 50 in. 45%

NOTE—There is not entire uniformity in lists used by jobbers.

**Skins, Wagon—**

Cast Iron 70.75@10%

Steel 40.45%

**Slates, School—**

Factory Shipments.

"D" Slates 50.45@10%

Eureka, Unexcelled Noiseless 60.45



Electro (Artificial), $\frac{1}{2}$ doz.	\$12.00	gro.	33%
Lightning (Artificial), $\frac{1}{2}$ doz.	\$18.00	gro.	33%

**Stoppers, Bottle—**

Victor Bottle Stoppers.....	$\frac{1}{2}$ doz.	\$9.00
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**Stops—Bench—**

Millers Falls.....	15	10%
Morrill's, $\frac{1}{2}$ doz., No. 1.....	\$10.00	50%
Morrill's, No. 2.....	\$12.50	50%

**Door—**

Chapin-Stephens Co.....	60	60	10%
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**Plane—**

Chapin-Stephens Co.....	20%
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**Straps—Box—**

Cary's Universal, case lots.....	20	10	10%
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**Stretchers, Carpet—**

Cast Iron, Steel Points, doz.	60	60	10%
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Socket.....	doz.	\$1.60
Bullard, $\frac{1}{2}$ doz.....		\$1.00
Excelsior Stretcher and Tack Hammer Combined, $\frac{1}{2}$ doz.....		\$6.00

**Woven Fence—**

Franklin.....	ea.	\$3.75
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**Strops, Razor—**

Star Diagonal Strop.....	25%	
Carbo Magnetic, No. F.....	$\frac{1}{2}$ doz.	\$8.50

**Stuffers, Sausage—**

<b>Stuffers, Sausage—</b>			
Enterprise Mfg. Co.....	25	25	7 1/4 %
National Specialty Co., list Jan. 1, 1902.....			30
P., S. & W. Co.....	40	10	5 %

**Sweepers, Carpet—**

Bissell Carpet Sweeper Co., $\frac{1}{2}$ doz.		\$72.00
Superba, Crotch Mahogany.....		\$36.00
Triumph, Fancy Veneers.....		\$33.00
Parlor Queen, Figured Rosewood.....		\$30.00
Elite, Hungarian Ash.....		\$29.00
American Queen, Figured Mahogany.....		\$27.00
Ideal, Bird's-Eye Maple.....		\$25.00
Grand Rapids, Nickel.....		\$22.00
Japan.....		\$22.00
Standard, Nickel.....		\$22.00
Crown Jewel, Nickel.....		\$21.00
Japan.....		\$19.00
Crystal, Glass Top.....		\$16.00
Grand, 17 in. wide.....		\$16.00
Club, 24 in. wide.....		\$16.00
Hall, 28 in. wide.....		\$16.00
National Sweeper Co., $\frac{1}{2}$ doz.		\$12.00
Louis XV, Roller Bearing, Gold Plated.....		\$12.00
Hepplewhite, Roller Bearing, Silver Plated.....		\$12.00
Sheraton, Roller Bearing, Nickel.....		\$12.00
Ye Mission, Roller Bearing, Oxidized Copper.....		\$12.00
Transparent, Roller Bearing, Plate Glass top, Nickel.....		\$12.00
National Queen, Roller Bearing, Fancy Veneers.....		\$12.00
Loyal, Roller Bearing, Veneers.....		\$12.00
Nickel.....		\$12.00
Triple Metal, Roller Bearing, Nickel.....		\$12.00
Marion, Roller Bearing, Nickel.....		\$12.00
Marion Queen, Roller Bearing, Nickel.....		\$12.00
Monarch, Roller Bearing, Nickel.....		\$12.00
Monarch, Roller Bearing, Nickel.....		\$12.00
Perpetual, Regular B'rs, Jap. 18 in.		\$18.00
Monarch Extra (17 in. case), Roller Bearing, Nickel.....		\$16.00
Monarch Extra (17 in. case), Roller Bearing, Japanned.....		\$13.00
Auditorium (26 in. case), Roller Bearing, Nickel.....		\$14.00
Mammoth (30 in. case), Roller Bearing, Nickel.....		\$16.00
Streator Metal Stamping Co., Eureka Japanned.....	$\frac{1}{2}$ doz.	\$15.00
Model E, Sanitaire.....	$\frac{1}{2}$ doz.	\$25.00
Model A, Sterling.....	$\frac{1}{2}$ doz.	\$15.00
Model B, Sterling, Nickel.....	$\frac{1}{2}$ doz.	\$23.00
Model B, Sterling, Japanned.....	$\frac{1}{2}$ doz.	\$21.50
Model C, Sterling.....	$\frac{1}{2}$ doz.	\$21.50
Model D, Sterling.....	$\frac{1}{2}$ doz.	\$19.50

NOTE.—Rebates: 50c per dozen on three dozen lots; \$1 per dozen on five dozen lots; \$2 per dozen on ten dozen lots; \$2.50 per dozen on twenty-five dozen lots.

**Tacks, Finishing Nails, &c.**

Superba, Crotch Mahogany.....	\$36.00
Trunk and Clout Nails.....	\$22.00

NOTE.—The above prices are for Standard Weights.

**Miscellaneous—**

Double Pointed Tacks.....	90	4 or 5 tens
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**Tanks, Oil and Gasoline—**

R. M. Co., each:		
Oil.....		
Gasoline.....		
Emerald.....		
Gal. Queen City, Monarch.....		
30.....	\$4.00	\$3.30
60.....	\$4.25	\$3.60
Wilson & Friend Co.:		
Gal. Gasoline.....		
30.....	\$2.75	\$3.00
60.....	\$3.50	\$4.00
120.....	\$5.00	\$5.75

**Tapes, Measuring—**

Standard, Nickel,	\$22.00,	Japan, \$20.00
Crown Jewel, Nickel,	\$21.00;	
		\$10.00

Steel.....	\$3	1	3	45%
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Chesterman's.....	25	at	25	45%
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Kouffler & Esser Co.....	40	at	10	50%
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Favorite, Ass Skin.....	40	at	10	50%
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Favorite, Duck and Leather.....	25	at	25	10%
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Metallic and Steel, lower list.....	35	at		
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Lufkin's.....	35	at	35	5%
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Asses' Skin.....	40	at	10	50%
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Metallic.....	30	at	30	45%
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Patent Bend, Leather.....	25	at	25	10%
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Pocket.....	40	at	40	45%
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Steel.....	33	at	33	45%
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Wiebusch & Hilger.....	34	at	34	45%
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Chesterman's Metallic, No. 34L.....	25%
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Chesterman's Steel, No. 1038L.....	25%
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etc.....	35%
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**Teeth, Harrow—**

Steel Harrow Teeth, plain or headed, $\frac{3}{8}$ -inch and larger.....	per 100 lbs.	\$2.75	at	\$3.00
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**Thermometers—**

Tin Case.....	80	at	10	80	45%
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**Ties, Bale—Steel Wire—**

Single Loop.....	80	at	10	45%
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Monitor, Cross Head, $\frac{1}{2}$ doz.....	70	at	2	45%
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**Brick Ties—**

Niagara Brick Ties.....	25	at	10	5%
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**Tinners' Shears, &c.—**

See Shears, Tinners', &c.		
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**Tinware—**

Stamped, Japanned and Pieced, sold very generally at net prices.		
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**Tire Benders, Upsetters, &c.**

See Benders and Upsetters, Tire.		
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**Tools—Coopers—**

L. & I. J. White.....	20	at	20	45%
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**Haying—**

Myers' Hay Tool.....	45%
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Stowell's Hay Carriers.....	45%
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Forks, 45", Fork Pulleys.....	45%
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**Miniature—**

Smith & Hemenway Co.'s, Davidson, $\frac{1}{2}$ doz., Nickel Plated.....	\$1.50
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Gold Plated.....	\$2.00
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**Saw—**

Atkins' Cross Cut Saw Tools.....	35	at	5%
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Simonds' Improved.....	35	at	5%
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Simonds' Crescent.....	35	at	5%
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**Ship—**

L. & I. J. White.....	25%
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**Transom Lifters—**

See Lifters, Transom.		
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**Traps—Fly—**

Bulloon, Globe or Acme, doz.	\$1.15	at	\$1.25
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Harper, Champion or Paragon, doz.	\$1.25	at	\$1.40
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doz.	\$1.25	at	\$1.40
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**Game—**

Imitation Onocida.....	70	at	10%
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Newhouse.....	40	at	10%
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Ilawley & Norton.....	65%
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Victor.....	70%
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Onocida.....	50%
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**Mouse and Rat—**

Mouse, Wood, Choker, doz. holes	12	at	
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**Mouse, Round or Square Wire—**

doz.	85	at	90	1%
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**Marty French Rat and Mouse Trap (Genuine):**

No. 1, Rat, $\frac{1}{2}$ doz., case of 24.....	\$11.50	doz.
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No. 3, Rat, $\frac{1}{2}$ doz., case of 30.....	\$6.50	doz.
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No. 3, Rat, $\frac{1}{2}$ doz., case of 30.....	\$5.75	doz.
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No. 3, Rat, $\frac{1}{2}$ doz., case of 72.....	\$4.70	doz.
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No. 4, Mouse, $\frac{1}{2}$ doz., case of 150.....	\$3.00	doz.
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No. 5, Mouse, $\frac{1}{2}$ doz., case of 150.....	\$2.25	doz.
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**Trimmers, Spoke—**

Wood's E L.....	50%
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**Trowels—**

Disston Brick and Pointing.....	25%
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Disston Plastering.....	25%
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Disston "Standard Braid" and Garden Trowels.....	30%
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Kohler's Steel Garden Trowels, $\frac{1}{2}$ doz., 5 in., \$4.80; 6 in., \$6.00.....	25%
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Never-Break Steel Garden Trowels.....	25%
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Rose Brick and Plastering.....	25%
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Woodrough & McParlin, Plastering.....	25%
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**Trucks, Warehouse, &c.—**

B. & L. Block Co.....	50	at	10%
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New York Pattern.....	50	at	10%
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Handy Trucks.....	9	at	18	00
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Grocery.....	9	at	18	00
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Daisy Store Trucks, Improved Pattern.....	9	at	22	50
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McKinney Trucks.....	each	net	\$10.00
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Model Store Truck.....	$\frac{1}{2}$ doz.	\$18.50
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**Tubs, Wash—**

Mfg'r's list, price per gross.		
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No. 0.....	1	2	5
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Galvanized.....	\$67	\$79	\$89	\$99	10%
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Galvanized Wash Tubs (H. M. Co.):		
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No. 0.....	1	2	5
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Per gro.....	\$54.00	76.00	96.00	56.00
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No. 10.....	20	30
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Per gro.....	\$38.00	96.00	108.00	10%
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**Twine, Miscellaneous—**

Flax Twine:		
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No. 9, $\frac{1}{4}$ and $\frac{1}{2}$ -lb. Balls.....	23	at	25	4%
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No. 12, $\frac{1}{4}$ and $\frac{1}{2}$ -lb. Balls.....	21	at	22	4%
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No. 18, $\frac{1}{4}$ and $\frac{1}{2}$ -lb. Balls.....	18	at	20	4%
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No. 24, $\frac{1}{4}$ and $\frac{1}{2}$ -lb. Balls.....	17	at	19	4%
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No. 36, $\frac{1}{4}$ and $\frac{1}{2}$ -lb. Balls.....	16	at	18	4%
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Chalk Line, Cotton.....	26	at	31	4%
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Cotton Mops, 6, 9, 12 and 15 lb. to doz.....	11	at	19	4%
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Cotton Wrapping, 5 Balls to lb. according to quality.....	15	at	23	4%
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American 2-Ply Hemp, $\frac{1}{4}$ and $\frac{1}{2}$ -lb. Balls.....	14	at	15	4%
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American 3-Ply Hemp, 1-lb. Balls.....	15	at	16	4%
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India 2-Ply Hemp, $\frac{1}{4}$ and $\frac{1}{2}$ -lb. Balls (Spring Twine).....	10	at	11	4%
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India 3-Ply Hemp, 1-lb. Balls.....	10	at	11	4%
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India 3-Ply Hemp, $\frac{1}{4}$ -lb. Balls.....	10
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